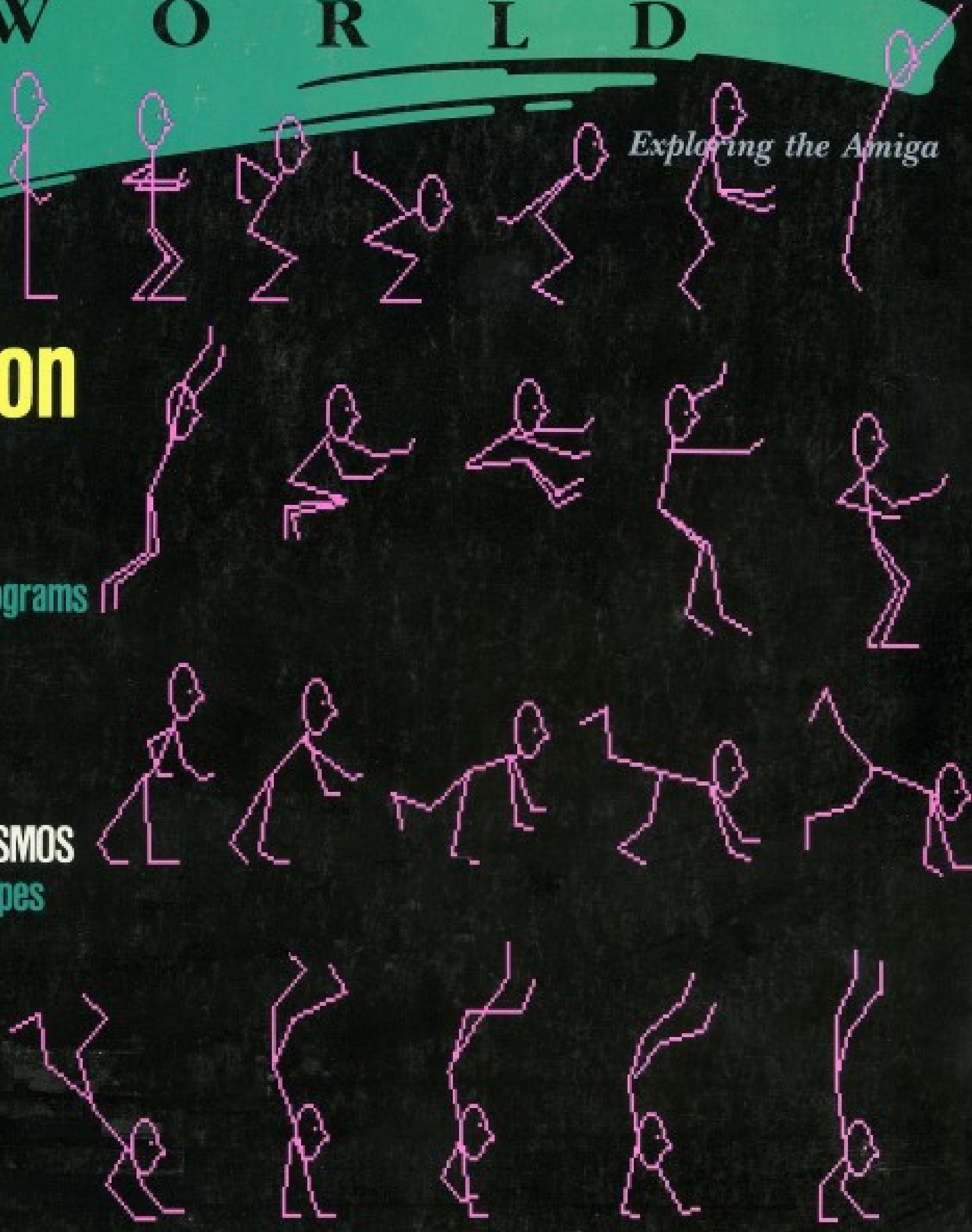
Amigas on Miami Vice

AMIGA WORLD

September/
October 1986
U.S.A. $3.95
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A CWCI
Publication

Exploring the Amiga



Amiga Animation

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AMIGA SIDECAR
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PAINTING THE COSMOS
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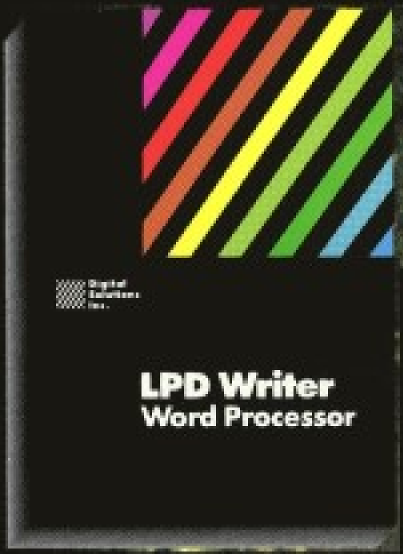
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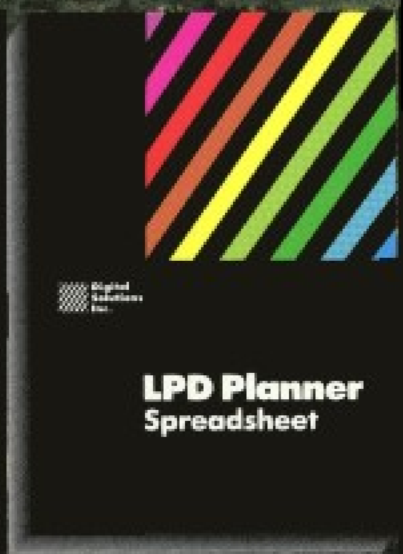
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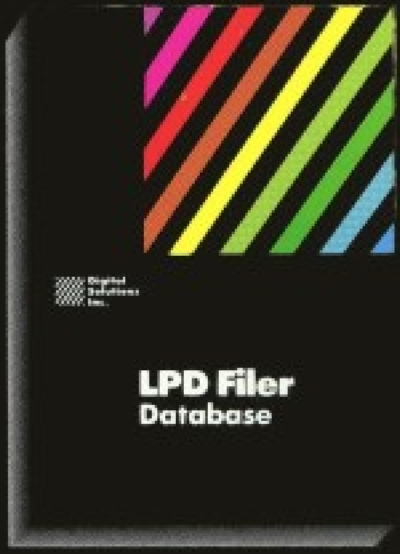
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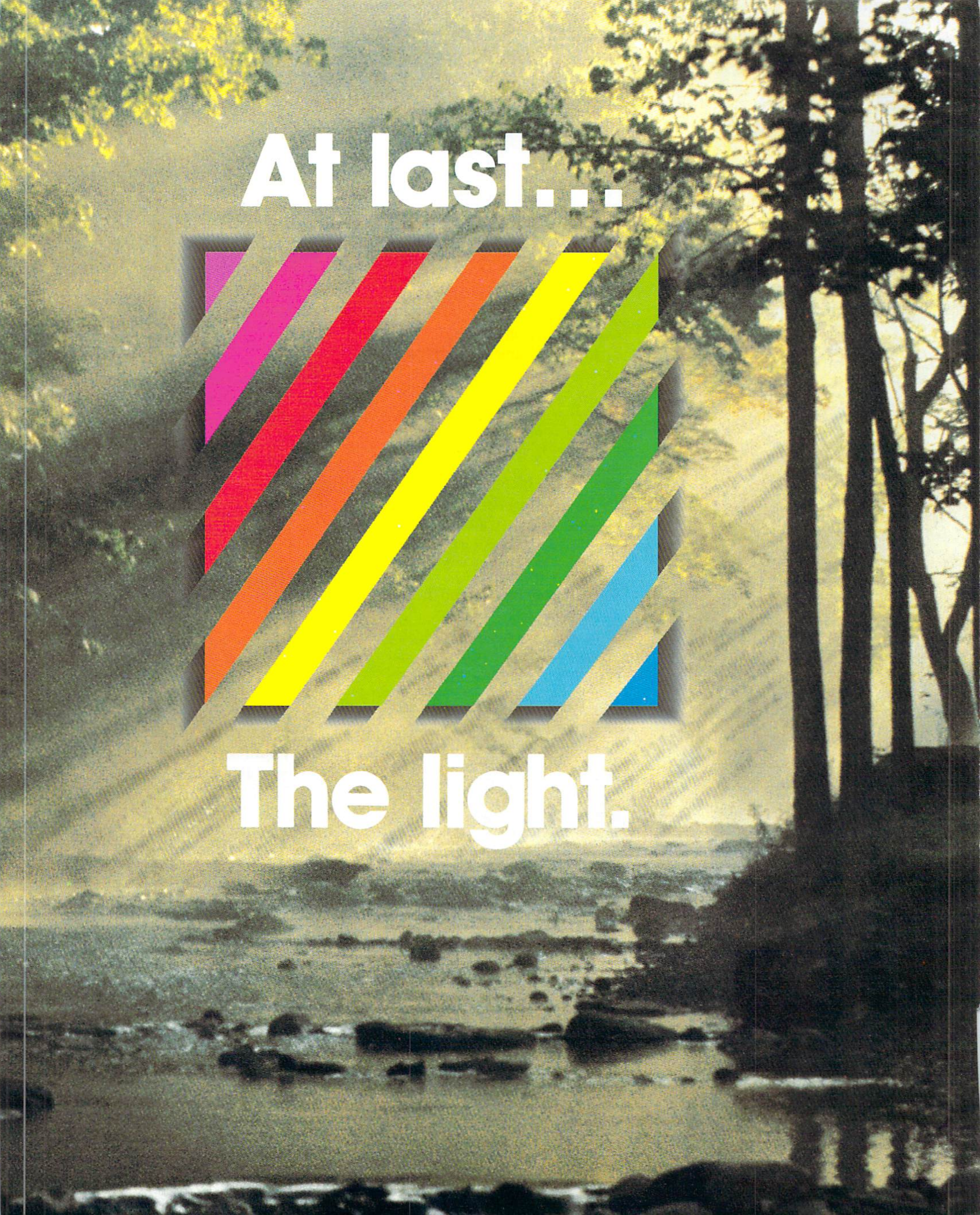
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*Available October, 1986

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At last...
The light.

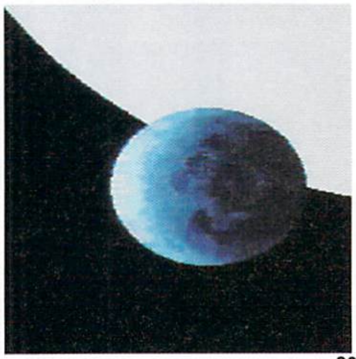


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C O N T E N T S

VOLUME 2, NUMBER 5

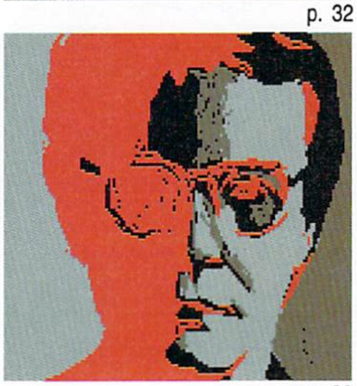
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FEATURES

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Zeitgeist

By Guy Wright

Much has transpired in the past few months, some of it positive and some of it negative. Commodore announced losses for the last quarter at the same time that income had increased. They laid off a number of employees and the press quickly jumped on them, some going as far as saying that Commodore and the Amiga were dead. I got many calls from concerned readers. Was Commodore discontinuing the Amiga? Is Atari running away with the market? Was Commodore folding? Did they close down the Los Gatos plant? Who was fired? Just what was going on, anyway?

I have been following Commodore for a number of years and while this recent news isn't great, it doesn't really bother me either. I've seen Commodore and other computer companies make worse mistakes. From Commodore there was the Plus 4 and the C-16; from IBM the PC-Junior; Apple had the III and the Lisa; Tandy manufactured the model II and MC-10. Remember Texas Instrument's 99-4A, the Coleco Adam, etc., etc.?

So why is the press so quick to write Commodore obituaries? Because Commodore is an easy target. It is very difficult to get much information from them, and they have alienated a number of reporters in one way or another. Sometimes they don't say enough and sometimes they say too much.

Commodore isn't going to fold. They aren't going to drop the Amiga. Atari isn't burying the Amiga in the sales race.

Another up note is that software and hardware is beginning to show up at a steady rate around the *AmigaWorld* offices. (There is so much Amiga Betaware floating around that we finally decided that we won't review products unless they are in a shrink-wrapped package and 100% ready for sale.) The number of companies producing, or in the process of producing, products for the Amiga has expanded to the point where we had to increase the size of the magazine to accommodate the additional advertisements. We are getting more and more calls, mail, visits from people who are doing some amazing (did I say that?) things with their Amigas, and despite the stormy press and events at Commodore, the users, developers, fans and Amigaphiles have been progressing at an impressive rate.

The advantage of having so much software and hardware show up is that the future of the Amiga begins to slip out of the hands of Commodore and into the hands of the users and manufacturers. After a certain point in the evolution of a new machine, the end users become the driving force and the machine succeeds or fails because of them, not because of the company's marketing (or lack thereof). So, no matter what Commodore does or doesn't do with the Amiga, its future is set. People are using the Amiga to do things that other computers just can't do, and with extra nudges, peripherals, software and imagination, the Amiga is finding itself in the most unusual and creative places.

Animation is one of those creative areas where the Amiga is already starting to generate some excitement. As you will see in this issue, there is a lot more to Amiga animation than Robo City and bouncing balls. Cel animation techniques on the Amiga are causing quite a stir in the animation field. We are beginning to hear about Amigas being used in some glamorous places by some pretty impressive people. The artist Walter Williams, who created the hapless Mr. Bill for *Saturday Night Live,* is using an Amiga as you will see in "Oh No! It's Mr. Bill!" (p. 22). There is a possibility that you will be seeing Amigas on the set of Miami Vice this season (they wanted to "tech-up" the show a bit). We have heard that Disney Studios now has a handful of Amigas. Lucasfilms has been working with Commodore on a few projects. Other rumors have been floating around and we have been treking them down. The great thing is that most of them turn out to be true.

But just in case you prefer the less glamorous and more practical, we have included more meat to sink your teeth into. Part II of our series "Fundamentals of C." "Using Libraries from AmigaBasic" and "AmigaBasic Graphics Primer" for those less C-inclined. This installment of info.phile talks about file management, and our feature review takes a look at Images and Animator, both from Aegis. And even if you don't care about animation or graphics or art, take a look at "Astronomical Art and the Amiga" (p. 26). Here's an artist who uses the Amiga for more than just spacey pictures; there's some serious number crunching going on here.

The latest Comdex was held in Atlanta, and Bob Ryan, our staff techie, brought back a lot of information. In his special Comdex report ("The Amiga Shows Up"), Bob talks about Maxiplan, DeluxeVideo and the Sidecar, Commodore's MS-DOS hardware expansion chassis that should be available sometime this Fall. (Where have I heard that before?) And for those interested in the IBM-PC software emulator that has been shipping, we have a no-fluff, hard-hitting review of the Commodore Transformer.

Finally, judging by the response to our July/August issue, Hors d'oeuvres is an instant success and people liked our more substantive coverage. We have been fine tuning *AmigaWorld* all along, but we can really use your feedback. Let us know what you think about the magazine, the articles, the artwork, the columns, any and everything. We have to know when we're striking the right notes with you and when we're out of tune. If you don't like something, tell us. If something we publish really turns you on, then tell us. If you don't want your comments to wind up in our letters column, Repartee, then just say so at the top of the letter and we will just keep it between you and us. If you want to give us a call, we are fairly easy to talk to and never too busy to listen to a reader. After all, you pay our salaries... which reminds me, I could use a raise.■

Repartee

Bravo to the Dumb Blonde

As a reader of your magazine since the premiere issue, I was beginning to worry that AmigaWorld *was going to be a proverbial "dumb blonde"—that is, all looks and no brains. While your's is the slickest, most stylish computer publication around, it suffered from a noticeable lack of substance. However, my fears have been laid to rest by the May/June issue. With information on AmigaDOS, the text editor, DeluxePaint, IFF, screen-to-slide transfers, Amiga Basic and more, you at last have begun to provide the type of useful, enlightening articles your readers have been waiting for. I hope this is a taste of things to come!*

Timothy Doherty
Honolulu, HI

As I read (every page) of the May/June issue of your publication, I felt the urge to stand up and issue the staff of AmigaWorld *a hearty "Bravo." You have succeeded in the delicate task of providing specific, technical information while continuing to offer thought-provoking material about the use and future of the Amiga and microcomputing in general.*

I especially appreciate the unbiased candidness of your hardware and software reviews. This renders them truly useful.

I am positive that I speak for a majority of Amiga followers and owners as I ask you to continue to provide issues which reflect the content and style of the May/June edition.

Rick Carpenter
Pascagoula, MS

Warhol Means Business

I was both surprised and disappointed by the vitriolic tone of the letters about your Andy Warhol article. I think that these correspondents are negatively judging Warhol because of his celebrity status and enigmatic personality rather than clearly considering his very real talent, contributions and achievements.

Andy Warhol is an internationally recognized and respected artist who has created original and uniquely American images that portray aspects of American life and behavior in ways that are both revealing, insightful and disquieting, and with greater depth than some people apparently have the willingness or ability to perceive. Warhol using an Amiga can only benefit the Amiga and its users by focusing attention and publicity on the Amiga and its special qualities and abilities.

As far as the art versus the business issue is concerned, art is a business! Art, design and graphics are a part of commerce just as much as spreadsheets and databases. Art and design are all around you if you look. Art, design and graphics are billion dollar industries that generate income, improve products and services and employ hundreds of thousands of people.

My wife, who is the art director for a $30 million garment manufacturing company, purchased two Amigas and peripherals that are in use eight to 10 hours a day designing textile patterns and garments and doing fast recolorations of past artwork. That's art and that's business!

Gary H. Reams
Los Angeles, CA

On the *n*th Day of Christmas

Since buying my Amiga, I have received without charge:

Three updated disks and a new manual from Commodore.

An unsolicited refund check from Electronic Arts, accompanying an apology that they were unable to immediately fill a software order, and later, an unexpected DeluxePaint backup disk.

A free swap and upgrade of Okidata's IBM plug-n-print kit I had purchased upon erroneous recommendation by Commodore.

Two Okimate 20 printheads after I reported to the service outlet that my original one wore out prematurely.

These companies definitely show class. Earnestness in assurring customer satisfaction is so rare today that indeed, it is a bit startling. Although poor documentation and lack of standards continue to vex and alienate the "computing consumer," in the area of conscientious customer service, we may be seeing a refreshing return to the days when the customer was king.

Dick Mealey
Clear, AK

Better Late Than Early

I want my $495 back for my monitor. I was told when I purchased my Amiga (with a monitor at an extra cost of $495) that there would be no price reductions for the Amiga. Every store I went to gave me that very same promise and said word for word that this no-price-change policy was straight from Commodore. Now I can purchase an Amiga for $1,295, the same price as before, but I get a free monitor. Perhaps Commodore feels that since the actual price of the Amiga has not changed that they are living up to their promise. That's a pretty sad excuse for a promise, if you ask me. Believe me, if I knew I could save the $495 for the monitor when I was shopping last fall, I would have done so.

Robert F. Halle
Southfield, MI

I realize that Commodore Business Machines has found it necessary to introduce its $500 price reduction on the Amiga (purchased with monitor) to remain competitive and to boost sales. However, I am wondering what Commodore is planning to do for those people, like myself, who bought the Amiga when it was first introduced. We took a significant risk by buying a computer with an uncertain future from a company whose future was even less certain. I think it would only be reasonable for Commodore to provide original (pre-rebate) purchasers with some of the software that Commodore advertises new purchasers will be able to afford because of the price reduction. How about it, Commodore?

Christopher R. Geiss
E. Northport, NY

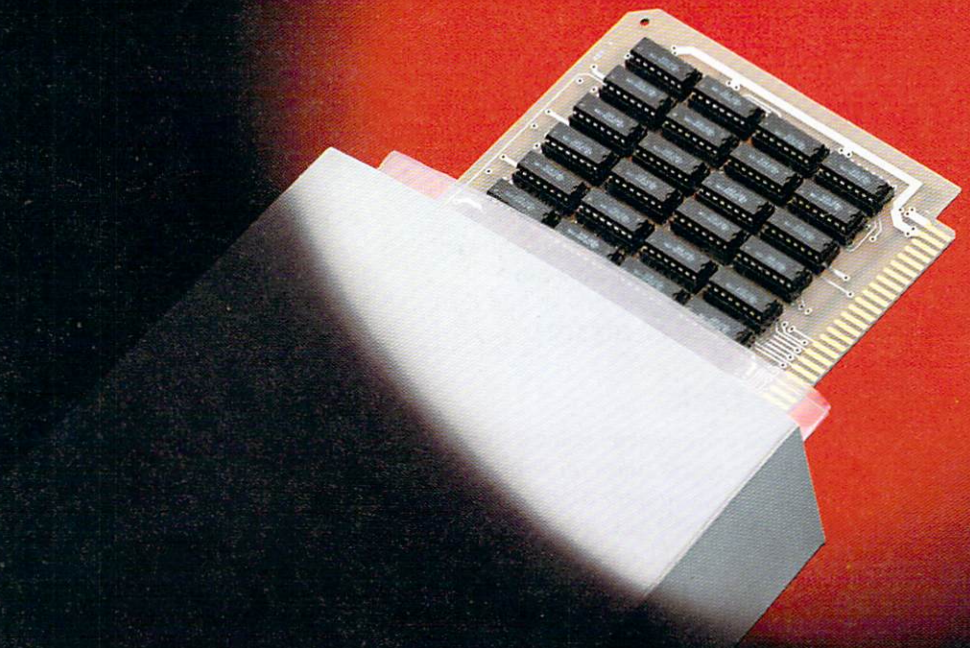
The $500 rebate ended June 1. Unfortunately, at press time, Commodore had not announced any plans to offer early Amiga buyers price or compensation benefits.

—Editors

Send your letters to: Repartee, *AmigaWorld* editorial, 80 Pine St., Peterborough, NH 03458. Letters may be edited for space and clarity.

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Hors d'oeuvres

Here is another serving of Amiga delicacies for your dining and dancing pleasure. Meaty morsels stuffed with subtle seasonings and tangy spices, all "byte-sized" and easily digestible; hints, tips and ideas to delight the palates of all Amiga users. Pop a few into your hungry Amiga and watch the smile spread across it's face. Yours for the sampling, these gems are baked especially for discriminating tastes. All we ask is a fair trial and...perhaps you *have an idea or two for the sharing.*

If you are so inclined, then send us your hors d'oeuvres with your name, address and T-shirt size. (Ah yes, even though we keep all Hors d'oeuvres entries, we don't pay cash for these goodies. However, to anyone submitting an accepted entry, we will send an official *AmigaWorld* T-shirt that will have your friends salivating with envy!) Send 'em hot-off-the-grill to: *AmigaWorld* Hors d'oeuvres, 80 Pine St., Peterborough, NH 03458.

A note of warning: although we check ingredients, not everything spread on this table is 100 percent guaranteed. If you find a tip not to your liking, let us know so we can cross it off the menu next time.

Once again, *Bon Appétit!*

Date/Time Startup Follow-up

In the July/August '86 issue of *AmigaWorld* we published an Hors d'oeuvres tip for setting the date and time during the startup-sequence. We have received a few calls about it from people who couldn't get it to work. There are three problems responsible. First, there has to be a *space* between the word DATE and the question mark that follows it. (There is a space in the magazine, but it is a very thin one and many people didn't see it.) Second, a few developers found that the DATE ? command does not work with Workbench version 1.2 (the problem has been reported to Commodore). Third, in the Echo prompt showing the date and time format, an extra Y slipped in somehow. The line should read: ECHO "DD-MMM-YY HH:MM".

Quicker Disk

With a two-drive system, you can improve your directory access times on frequently used disks using a simple trick. Just format a new disk (and INSTALL if it is going to be a Workbench disk), then with the disk you want "fixed" in the internal drive and the new disk in the external drive, from the CLI type:

```
COPY DF0: TO DF1: ALL
```

This reorganizes the file layout and improves the directory access times noticeably.

Noah Sherman
Olympia, WA

Three Copy Tips

1) Copying files can be a very slow process, especially if the source and destination files are on the same disk. This is because AmigaDOS uses a maximum buffer size of 512 bytes. 512 bytes are read, then written, read then written, etc., until the file is copied. You can increase the buffer size, and on files of 10K or so you can also increase the copy time by a factor of five or more. From the CLI use this sequence:

COPY *sourcefilename* TO RAM:
COPY RAM:*sourcefilename* TO *destinationfilename*
DELETE RAM:*sourcefilename*

2) If you find yourself copying a large number of files between multiple disks, no doubt you're sick of reinserting your Workbench disk every time you turn around. The reason you have to keep swapping disks is that AmigaDOS has to reload the copy program each time it is used. You can eliminate all the swapping by putting a copy of COPY on a RAM disk by entering the following sequence from CLI:

```
COPY C:COPY TO RAM:
```

Then when you want to copy a file type:

RAM:COPY *sourcefilename* TO *destinationfilename*

3) The last copy trick is to use RENAME instead of COPY. This will only work if the source and destination files are on the same disk and if you only want one copy of the file, not two. For example, you could use RENAME to move a file from one subdirectory to another subdirectory on the same disk. The advantage to using RENAME over COPY is that the file is not copied—only its pathname is changed. The RENAME command takes less than a second, regardless of the size of the file.

David Allen
Westbury, NY

Editor's Note: In the above examples using the COPY command, the word TO is optional, but we like to include it anyway because it isn't that hard to type and it clarifies things quite a bit when you are looking back over a screenful of COPYing. For more detailed information about copying files, check our "info.phile" column in this issue.

VCR as Monitor

Due to limited finances, when we bought our Amiga we could not afford an external drive, memory expansion, or even the Amiga monitor. We had planned to use our home television set, but the salesman at the store said that would be difficult. He did, however, say that we might be able to connect the Amiga to the television through a home VCR, but he couldn't guarantee the results.

We bought the Amiga anyway and headed home after a quick stop at Radio Shack for cables. *(ED's note: see our next tip* ►

Circle 23 on Reader Service card.

Software designed for AMIGA.

Lattice C Compiler — *$149.95*

With more than 30,000 users worldwide, Lattice C Compilers set the industry standard for MS-DOS software development. Lattice C gives you all you need for development of programs on the AMIGA. Lattice C is a full implementation of Kernighan and Ritchie with the ANSI C extensions and many additional features.

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Allows AMIGA development on your MS-DOS system. Price includes the above product.

Lattice Screen Editor (LSE™) — *$100.00*

Designed as a programmer's editor, *Lattice Screen Editor (LSE)* is fast, flexible and easy to learn. *LSE's* multi-window environment provides all the editor functions you need including block moves, pattern searches and "cut and paste." In addition, *LSE* offers special features for programmers such as an error tracking mode and three Assembly Language input modes. You can also create macros or customize keystrokes, menus, and prompts to your style and preferences.

Lattice dBC III Library™ — *$150.00*

The *dBC III library* lets you create, access and update files that are compatible with Ashton-Tate's dBASE system. *dBC III's* C functions let you extend existing dBASE applications or allow your users to process their data using *dBC III* or dBASE III.

Lattice Make Utility (LMK™) — *$125.00*

An automated product generation utility compatible with UNIX Make, *Lattice Make Utility (LMK)* lets you rebuild complex programs with a single command. Once you specify the relationships of the various pieces of your system in a dependency file, *LMK* automatically rebuilds your system the same way every time, and only compiles program files that have changed. But *LMK* is not limited to updating programs. You can use *LMK* to update documentation or perform **any** executable command!

Lattice Text Utilities™ — *$75.00*

Lattice Text Utilities (LTU) consists of eight software tools to help you manage your text files. GREP searches files for the specified pattern. DIFF compares two files and lists their differences. EXTRACT creates a list of file names to be extracted from the current directory. BUILD creates batch files from a previously generated file name list. WC displays the number of characters and optionally the checksum of a specified file. ED is a line editor which can utilize output from other *LTU* software in an automated batch mode. SPLAT searches files for a specified character string and replaces every occurrence with a specified string. And FILES lists, copies, erases or removes files or entire directory structures which meet the specified conditions.

Lattice Unicalc® Spreadsheet — *$79.95*

Unicalc is a simple-to-operate program that turns your AMIGA computer into an electronic spreadsheet. Using *Unicalc* you can easily create sales reports, expense accounts, balance sheets, or any other reports you had to do manually.

Unicalc offers the versatility you've come to expect from business software, plus the speed and processing power of the AMIGA.

• 8192 row by 256 column processing area • Comprehensive context-sensitive help screens • Cells can contain numeric, algebraic formulas and titles • Foreign language customization for all prompts and messages • Complete library of algebraic and conditional functions • Dual window capabilities • Floating point and scientific notation available • Complete load, save and print capabilities • Unique customization capability for your every application • Full compatibility with other leading spreadsheets.

Lattice MacLibrary™ — *$100.00*

The *Lattice MacLibrary™* is a collection of more than sixty C functions which allow you to quickly and efficiently take advantage of the powerful capabilities of the AMIGA.

Even if your knowledge of the AMIGA is limited, *MacLibrary* can ease your job of implementing screens, windows and gadgets by utilizing the functions, examples and sample programs included with the package.

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Panel™ — *$195.00*

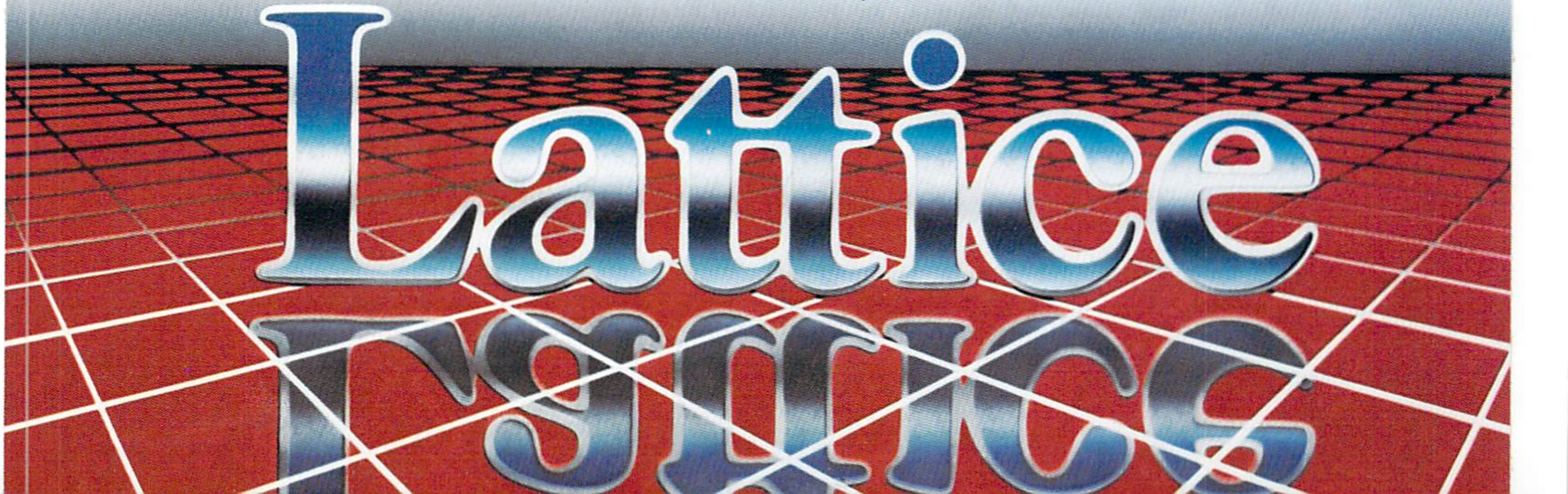
Panel will help you write your screen programs and layer your screen designs with up to ten overlapping images. *Panel's* screen layouts can be assigned to individual windows and may be dynamically loaded from files or compiled into a program. *Panel* will output C source for including in your applications. A monitor and keyboard utility is also included to allow you to customize your applications for other systems.

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about cables.) When we hooked everything up, it turned out to work beautifully! Not only could we use the VCR as a "TV/Amiga interface," but we then had the added advantage of being able to record directly from the Amiga onto videotape. We have since added an audio cassette deck and we make Amiga Videos for our friends.

In short, we are happy with our minimum purchase and have found an added dimension to owning a home computer.

Ruth Jenkins and Jeff Collins
Tucson, AZ

VCR Connection

Those of you who are video buffs may be wondering how to connect your Amiga to a VCR. It is really quite easy. On the back of the Amiga there is composite video output running through a female RCA video jack (marked simply VIDEO). Just use a cable with an RCA male connector at each end. (Radio Shack part number 422365 is about a three foot long cable, but they sell longer cables as well.) Plug one end into the Amiga video output jack and the other end into the jack marked VIDEO INPUT on the back of your VCR. That's all there is to it!

Sonny Shrivastava
San Ramon, CA

Editor's Note: If you want to get fancier, buy two RCA male-to-male cables and a "Y" cable (RCA male, male-to-female) so you can connect your Amiga audio to the VCR as well. The male ends of the Y cable plug into the audio output jacks on the back of the Amiga; your second male-to-male cable connects the female end of the Y to the AUDIO INPUT jack on the VCR. If you have a stereo VCR, just buy three RCA male-to-male cables (one for video and one for each of the audio channels).

Auto CLI Window

I am a fifteen-year-old student living on Long Island and I have a tip that might be useful for people who like to use both the CLI and Workbench. First, *make a copy* of your Workbench as a precaution. From the CLI prompt type:

```
ED S/STARTUP-SEQUENCE
```

then move the cursor down and add the following line just *before* the last line (which reads ENDCLI >NIL:):

```
NEWCLI CON:540/150/100/50/CLI
```

Press the escape key, then the X key and return to save your modified startup-sequence. (If you mess things up hopelessly, press Q instead of X to bail out of the editing without saving your changes.)

This command opens a new CLI as a console window, which means that you must give the X and Y coordinates, the width and height of the window, and a title. The first two numbers in my line above (540 and 150) are the X and Y coordinates, which determine the placement of the window (in this case the lower right of the screen). The next two numbers (100 and 50) are the width and height of the window; the last part (CLI) is the name that you want to appear on the title bar of the new window. The Workbench screen is in the 640 × 200-pixel mode, so consider this if you want to change the location of the window; note that, in my example, 540 + 100 = 640 (screen pixel width), and 150 + 50 = 200 (screen pixel height).

Once you have altered the startup-sequence and rebooted, you will be in Workbench, but a small CLI window will be automatically opened in the lower right of the screen. The advantage of this method is that you don't have to have quick fingers for a CTRL-D, or lots of patience for opening drawers and windows to get to a CLI. And when you want to go back to Workbench from the CLI, you don't have to type LOADWB return ENDCLI as you would with other variations of startup-sequences.

Michael Rubino
Commack, NY

Editor's Note: When you use ED to modify or create a file like the startup-sequence, and then hit escape, X, and return to save your changes, the CLI "> " prompt will appear on the screen for a few seconds before the disk operations are complete. WAIT FOR THE RED LIGHT TO STOP before rebooting with CTRL, Amiga, Amiga, or you may scramble your disk. We discovered this one the hard way.

Joysticks

Contrary to what my dealer told me (that I would have to buy an Amiga joystick if I wanted to play such games as Electronic Arts' Seven Cities of Gold), you can use any of the numerous Atari joysticks available (or Commodore 64, VIC-20, etc.). IBM, Apple and Radio Shack joysticks, however, will *not* work.

Robert E. Keeley
Berwyn, IL

Amiga Basic Joysticks

While trying to use the joystick functions STICK and STRIG in Amiga Basic, I found some errors in the documentation (pp. 8-143 and 8-144). The manual states that return values for the Y directions on both A and B joysticks are 1 for the "up" direction and − 1 for the "down" direction. Actually it is the other way around. A return value of 1 means down and a return value of − 1 means up. The X direction functions are described correctly in the manual.

The STRIG function explanation has two mistakes. First, the return value stated for "depressed fire button" is 1 when it should be − 1. Second, the subscripts to acquire status from B joystick should read STRIG (2) and STRIG (3), not STRIG (0) and STRIG (1).

This was aggravating to figure out, so I thought I would share this information with others who may want to use these functions in their own programs.

Rob Fallier
Vidalia, GA

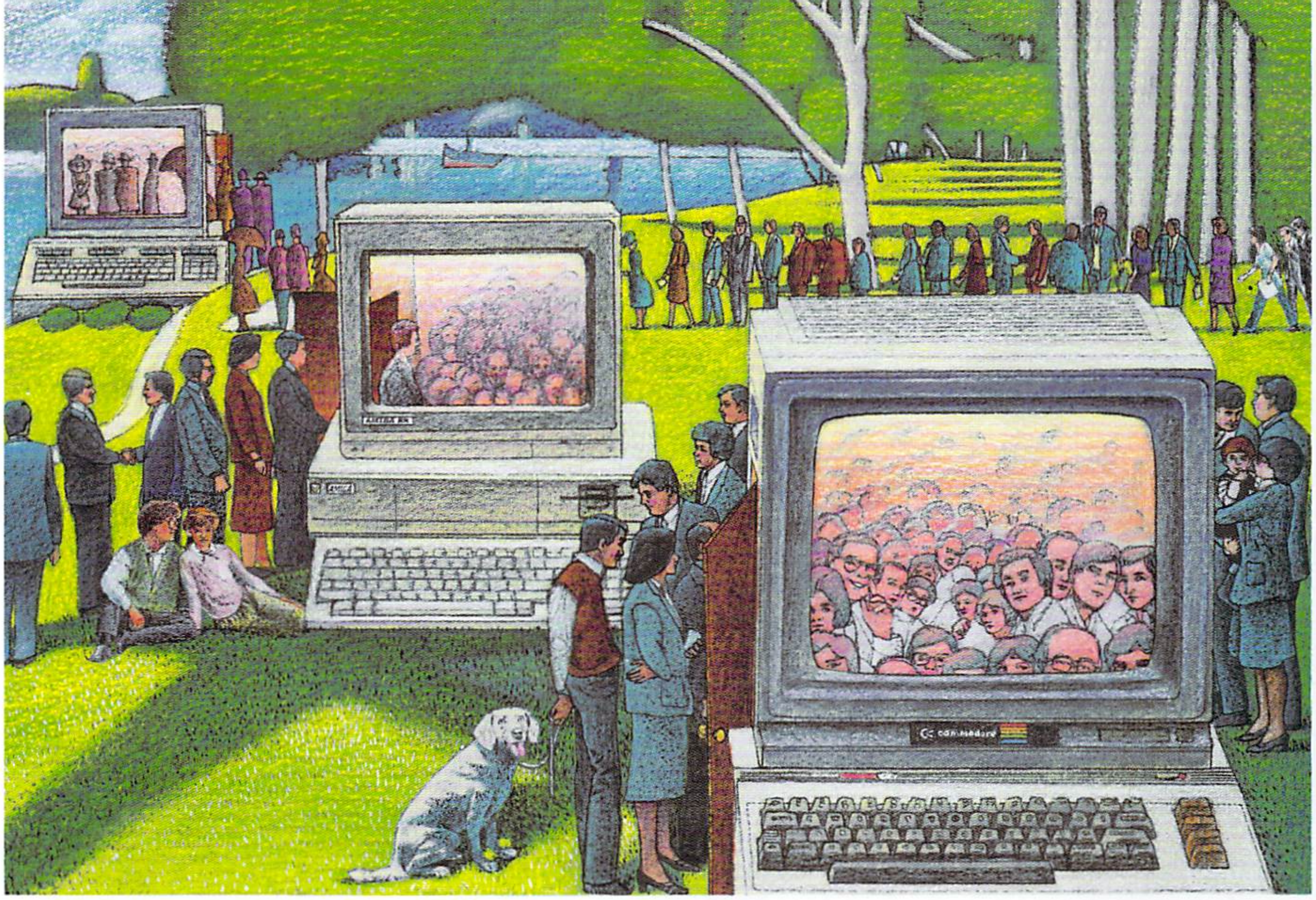




Illustration by Steven Lyons

The Illusion of Life: Traditional Character Animation On the Amiga

With the Amiga and a few good tools, you can create the visual magic of animation.

By Jeff Evans

Animation pervades our visual media. The proof of this is evident every time we sit for a while in front of the TV. Saturday morning cartoons, most TV ads, scientific and educational programs and news and documentary programs all employ special effects produced through the various techniques of animation. The animation community also creates much of the imagery used in modern mass communications. Animation in corporate training and promotional videos and slide shows is another common and enormously important use of the art.

Mickey and Bugs

It is generally agreed that the highest achievement of animation is *character animation*—the process of creating a series of images that conveys to the observer the "illusion of life." When we think of Mickey Mouse or Bugs Bunny, we think of a genuine character who, even if not real, has a memorable personality and distinctive characteristics. Our emotional response to Dumbo or Daffy Duck can be as real and strong as the response we have to Laurel and Hardy or Luke Skywalker.

Unfortunately, the art of classical character animation has become a very expensive and risky proposition. Over the last twenty years, good quality character animation has at times seemed to be on the verge of extinction, due to changing markets and rising costs. Recently there has been something of a revival due to the popularity of science fiction and fantasy films in general. However, full classical character animation as opposed to the limited Saturday morning variety is very difficult and rare.

All over the world, animators and animation enthusiasts have yearned for an economically viable and artistically satisfactory system to do quality character animation. Below I will describe something that could revolutionize this field—a fine quality animation system using the Amiga, available for around $3,500. First, though, let's take a brief look at the traditional method of character animation.

Animation Then and Now

In the traditional method, referred to as *cel animation* or *classical animation*, an animator draws a series of pictures on sheets of paper that are held in register by animation register pegs. The drawings are then traced or photocopied onto transparent sheets or *cels* (short for celluloid) and painted. The cels are then placed one by one over a background and photographed by a stand camera. The sequence of frames taken by the camera, when quickly and continuously projected onto a screen, provide the desired illusion of movement.

Since the heyday of classical animation, epitomized in the feature animations produced by Disney Studios, most of the innovations in animation have been concentrated on automating the production steps and replacing the time-consuming hand drawing and painting with computerized processes. The process I'll describe, which we'll call *AmigaAnimation*, attempts to reverse this trend in some respects by emphasizing the animator's personal hand-drawn images as the basis of the entire process, and by integrating the video production process on a couple of simple and inexpensive devices. All phases of the process are under the complete control of the animator, and at a cost that any individual or small organization can afford.

AmigaAnimation

The basic AmigaAnimation system comprises an animator with a pencil, a digitizing pad, an Amiga with 512K minimum and a VCR. The digitizing pad I used is called EASYL, and is made by Anakin Research Inc. (see the accompanying product profile). ►

Using EASYL, the animator makes a series of drawings on pieces of paper held in position by register pegs, as in the traditional method of animation. Sketching lightly on the sheets does not activate the pressure sensors. When the animator is satisfied with a drawing and firms it up by pressing harder with the pencil, the drawing is input to the computer by EASYL and displayed on the monitor.

This procedure is similar to the classical method so far, with one radical difference: It is the animator's mere act of drawing that inputs the "cel" into the animation process. This eliminates photocopying, painting, shooting on the animation stand and all associated costs.

At this point, the digitized drawing can be colored, placed over a background, or altered at will by the animator. Because EASYL images conform to the IFF format, many other Amiga images can be included, from a landscape produced with a paint program to a picture from a digitizing camera or a videocassette recorder. The image on screen can be stored on disk or dumped directly to videotape. A series of images sent to videotape can then be edited and dubbed using normal video-editing techniques.

Making Atomic Fried Chicken

My first crude example of AmigaAnimation was created in February 1986 in Toronto, Canada. I was invited to produce a computer video piece for a group art show in a small art gallery. The common theme was "chickens." (The gallery is next to a chicken packing plant, and the floor is continually covered with chicken feathers tracked in by patrons!) I decided to do a two-minute video entitled *Atomic Fried Chicken*, featuring a materialistic chicken who is made aware of the danger of nuclear war in a very sudden and final fashion. Using EASYL, I designed the character, sketched backgrounds, tried out color schemes and created the storyboard.

When I was satisfied with the pre-production planning, I started animating. Using the register pins mounted on EASYL, I drew the key drawings for the animation of the chicken character, sketching the drawings on separate sheets of paper. I drew lightly with a pencil, flipping the separate sheets and correcting the movements until I was satisfied.

Since I was sketching lightly, the initial drawings didn't activate the pressure sensors on EASYL; when I pressed harder while making the final over-drawing on each sketch, my act of drawing input the lines into the computer. If I made mistakes or wanted to change the drawing, I could "erase" part of the old drawing. I colored the drawings using the instant fill touch command with EASYL, and stored each image as a file on an EASYL data disk. After taking the files representing line drawings and transferring them over to DeluxePaint, I stored the figures as brushes on DeluxePaint data disks.

I then called up the background that I wanted to use and dropped the colored line drawings onto the background, one frame at a time. The resulting composite of animation drawing and background was then shot off the monitor screen with a video camera and stored on videotape. I could have sent the screen image direct to VCR via the Amiga video output plug, but I lacked the correct RCA jack and time was pressing, so I used a video camera.

I then took the videotape of the Amiga images to a VHS editing facility (they specialized in making videos of weddings and bar mitzvahs). In half an hour, the music track (the overture to *Also Sprach Zarathustra*) was synchronized to the images and the video was complete. I then used DeluxePaint to do the titles and credits.

The time involved from the beginning of the animation using EASYL to delivery of the finished film to the art show was 28 hours. The time actually spent animating and shooting onto video was 18 hours. The point to emphasize here is that this was a first attempt, and I was lacking the tools necessary for integrating sound and for editing on the Amiga. These tools should be available soon.

The cost of materials (four Fuji disks and one videocassette) was about $20, and the cost of VHS editing and mixing was about $12. Thus, the total cost of the video was around $32.

At the art show, the artists and the others attending were fascinated by a seemingly professionally-made (though slightly *fowl*) video that was obviously custom-made for the show.

Present Limitations

Obviously, any video shot from a TV screen with an ordinary video camera is not going to be very clear, yet it was watchable. All the frames still exist on disk, and I intend to redo the video using the video output on the Amiga, going directly to videotape.

With 512K available on my Amiga, it wasn't possible to use DeluxePaint and EASYL in high resolution with the speed and flexibility I wanted. I used low resolution

Continued on p. 18

Artist's EASYL

Anakin Research of Rexdale Ontario, Canada, has a pressure-sensitive digitizing tablet that makes entering traced or original drawn images directly to the Amiga an easy process.

EASYL allows the artist to draw on paper affixed to its surface and, depending on the amount of pressure applied, transfer the drawing directly to the Amiga's screen. EASYL has an 8 1/2 × 13-inch surface and a resolution of 1,024 × 1,024 pixels. It can be used with Amiga paint programs, or alone with its own software, which allows easy access to the Amiga's resolution levels. Images created with EASYL software are in IFF format. Source for the software is also included, facilitating special applications such as image processing.

EASYL is available for $499. Contact your local Amiga dealer or Anakin Research, 100 Westmore Drive, Unit 11C, Rexdale, Ontario, Canada M9V 5C3. 416/744-4246.■

Magazine

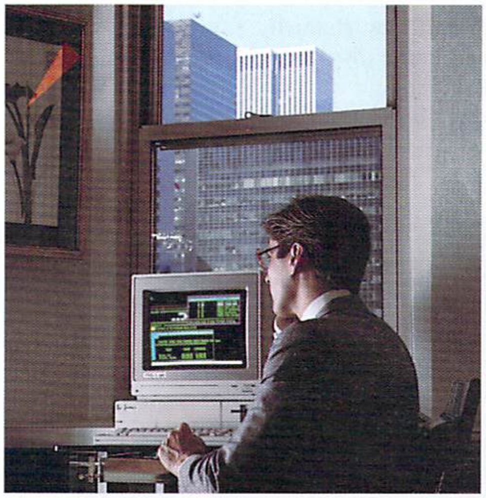
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Continued from p. 14

instead. The results were still amazingly good. RAM expansion and a hard disk will virtually be a must if you want to get the best and quickest results.

Backgrounds drawn with DeluxePaint are fine, but it would be nice to be able to use backgrounds executed in other media also (e.g., watercolors). With a video digitizer, this will be easy for you to do. It will also be much more feasible to synchronize frames with a sound track when genlock becomes available, which could dump a set number of frames to VCR.

Even at the maximum resolution of 640 × 400 pixels, video animation from the Amiga won't travel well to a big movie screen. However, on video it is excellent, and the whole aim of this process is to produce video as the final product.

Advantages

AmigaAnimation allows the production of fine character animation on video. It is "artist-friendly." I also found EASYL to be an incredibly responsive and simple tool for this purpose: The prerequisite for using EASYL is knowing how to hold a pencil! Since EASYL uses animation pegs to hold the paper sheets in register, the process of sketching, flipping, correcting and making the final drawing is preserved, thereby emphasizing traditional animation skills. This is the process by which the finest character animation in the world has been traditionally produced. EASYL replicates every subtle curve and change of line on the original drawing to the limit of the resolution mode.

AmigaAnimation radically simplifies the production process. The former procedure for character animation involved many widely separated steps, many specialists, and many complicated and expensive bits of machinery. In addition, the bureaucracy involved in finding the money for such projects and in keeping track of everything usually made the creative process very fragmented, and often left writers and animators with very little freedom.

However, this system is very accessible. Think of it: For about one third the price of a car, *anyone* can own a complete video-animation facility. The cost of an Amiga with two drives and 512K, EASYL, a VCR and a pencil is about $3,000. Many schools, businesses or individuals can, for an unprecedented price, do their own professional-quality animation production.

That's All Folks!

Will the Amiga figure in a reasonable solution to the neglect of traditional animation caused by its prohibitive costs? The implications of using the Amiga combined with the power of video to do this type of animation do seem significant enough to rekindle a lot of enthusiasm for this fascinating art form, on both professional and popular levels. AmigaAnimation could truly be a catalyst in a renaissance of traditional character animation.■

Address all author correspondence to Jeff Evans, c/o Vellum Print and Graphics, 37 Staffern Drive, Concord, Ontario, Canada L4K 2X2.

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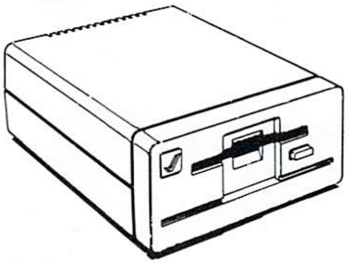
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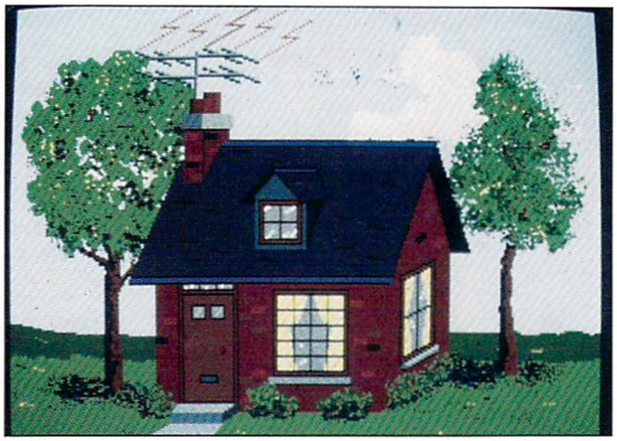
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Oh, No! It's Mr. Bill!

Filmmaker Walter Williams, creator of Mr. Bill, talks about using his Amiga to develop a new character for television.

By Melanie Ingalls



Bob Rose

Walter Williams, the master of "low-tech television," has traded his Super-8 camera for an Amiga and is at the keyboard these days, putting the finishing touches on a new character for television. "It's still in development and I'm not allowed to give it away," says Walter, "but I can tell you that he's a perfect character for the '80s—and the Amiga was invaluable in defining his look and personality."

Mr. Bill's New Buddy

You'll have to wait to find out *who* he is, but Walter talked at length about the part the Amiga played in his new character's development. "I wanted to show the network executives how the character would look and sound, without going to the effort and expense of filming a segment. So, I decided to do a short animated storyboard on the computer. Using my Amiga, I was able to draw the character, animate him, create voices and titles, and write and orchestrate a theme song. I laid it all out onto video, edited it just like a film and presented the tape to show them how the show would look."

He began by drawing the character's features—eyes, ears, nose, arms, legs—and saving them separately as brushes before assembling them. "This way," he says, "I could play with a single element, shrink or enlarge it, move it around, change the color, until I had exactly what I was looking for." He found that the Amiga was a perfect tool for sketching because it allowed him to change his mind freely. "If I'd been working on paper it would have taken me much longer."

After designing the character and the basic scenes, Walter worked with an artist friend to complete some of the compositions. "It was fun to see how quickly he took to the Amiga. He was amazed by the amount of



Walter Williams

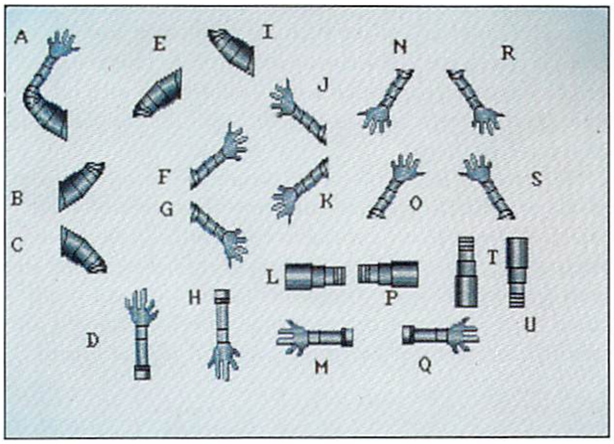
detail he could get in a picture using the magnify function; and he found it a great advantage to be able to save and reuse an object—not to have to draw it over and over, each time it appeared."

When he was satisfied with the elements of a scene, Walter tackled the problem of animation, using Aegis Animator. His character has arms and legs that rotate and telescope and he had to create sections—almost 30 in all—that would slide in and out of one another. It was his first attempt at traditional animation and he was impressed both by the size of the job and by the Amiga's ability to handle it. "There were so many things I wanted to do in each scene. I'm glad I cheated with Mr. Bill (who doesn't move without the help of Mr. Hands or a large truck) or I'd still be working on my first film!"

Some Fun Tricks

Walter's biggest problem was lack of memory. "I got a little panicked early on when the machine kept saying 'gotta go,' but I soon learned a few tricks." For example, he says, say no when the machine asks, "disable undo?" It will say, "have it your way," and let you continue with more memory. But beware: it might take the object you were working with and place it somewhere else on the screen. "To get it back, select Undo from the project menu. . . and hold your breath."

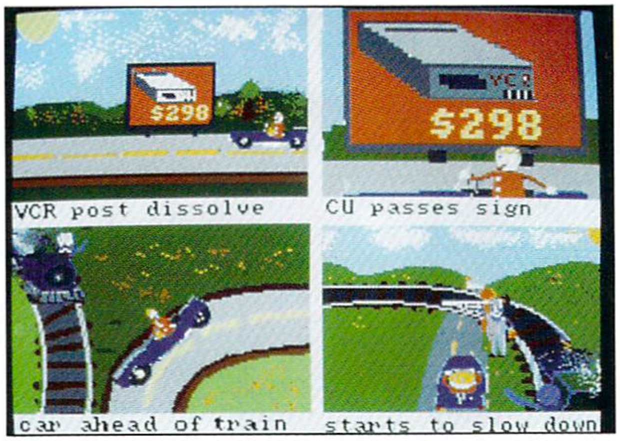
Memory shortage also caused continuity problems. Walter drew a family and a dog in front of a TV set and wanted to have the woman move her head while the dog's tail wagged. He didn't have enough memory to do both things in the same shot. However, he knew he could edit two shots together in video post-production if he could find a way to make the pictures line up. He discovered a trick. Save the first picture as ►



Walter Williams



Walter Williams



Walter Williams

Script A, go into the storyboard and splice the last tween of Script A onto a new storyboard frame. Save that new frame as Script B. Next, clear Script A from RAM by selecting New Script, load Script B, and continue the sequence. By splicing the last tween of the first sequence onto the next storyboard frame, the objects will be in alignment.

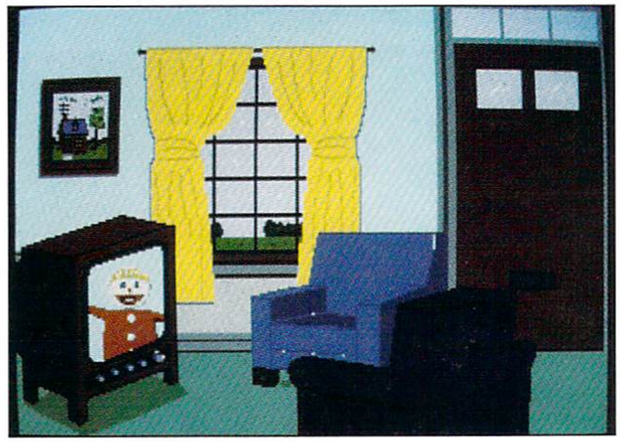
Walter is anxious to acquire more RAM expansion as soon as it becomes available. In the meantime, what is the best advice he can offer the would-be Amiga animator?: "Save every little piece and every movement as you go along...."

How He Did It

The final five-minute storyboard was made up of 53 shots created with DeluxePaint, Aegis Images and Aegis Animator. How would he compare these programs for creating images for animation? "Really, you can work with all three programs simultaneously, because they are all compatible and each has its advantages. In DeluxePaint, you can flip brushes. I could create the right arm of a character and flip it horizontally and I would have the left. You can also paint with two colors simultaneously (or erase with your background color) without going back to the palette. On the other hand, Images has many more drawing tools: parallelograms, polygons, lots of built-in shapes and brushes. It also has a watercolor function that creates a beautiful blend of colors. Animator's drawing tools are less sophisticated—one of my friends described it as drawing with a rubber band—but it is possible to create a fairly smooth curve by simply doing it in smaller increments. And when you draw in Animator, you have many more options for movement."

Beyond Playdoh

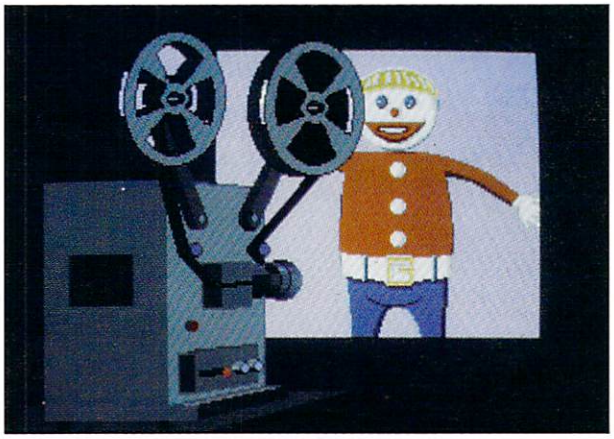
Beyond the presentation value of the storyboard, the Amiga added to the production in many other important ways. Not only did the computer help design the look of the character, but it influenced his personality, too. "Animator moves figures in a mechanical way, which was just perfect for this new figure. It helped me picture the way the final three-dimensional figure should move." Also, by designing on the Amiga, Walter was able to give his model-makers drawings from which to create the three-dimensional model of the character. "I was able to make Mr. Bill with my own hands because of my skills, developed in childhood, working with Playdoh. This character is made of more sophisticated materials, so I'm having an artist create the model. Using the Amiga, I can control the look of the character even though I can't make him myself."



Bob Rose and Walter Williams

Finally, Walter wrote and orchestrated the new show's theme song on the Amiga with Musicraft. "I don't really have the ability to write sheet music, even though I play the clarinet. But with the Amiga, and software that plays the notes as I place them, it is possible to compose, orchestrate and print music myself. This lets me get my ideas down so that I can collaborate with other musicians. I don't have to whistle and do a tap dance to explain it to them."

Walter knew that computers would ultimately be part of his work, but says that until now they seemed a bit alien. "My computer experience started in college with Fortran IV. Unfortunately, it took years before I had the courage to work with computers again. I guess I really came back to them from the game side." He bought an Intellivision when it first came out and played lots of



Walter Williams and Bob Rose

games like Motocross and Bi-planes. "Everyone thought I was goofing off, but the games really taught me how the machines work. Honest!" And, he laughs, "I guess all the hand/eye coordination it developed has finally paid off." He finds the Amiga combines the best aspects of a game machine—ease of use, user-friendliness, an icon-based command system—with the advantages of a powerful computer. "The Amiga is a machine I can use as an artist, not a programmer. I don't want to type commands all day."

Mr. Bill's Fan Mail

Walter thinks the Amiga is a perfect tool for a film-maker; he put his to use the minute he got it. "I was doing a Mr. Bill commercial for an appliance store chain. We needed to make some changes in the story-board and I drew them on the computer. I typed in the text below the shots and distributed color prints to the people involved in the production. It was very helpful. It showed us ways to simplify the action and gave us a clear idea of what we were after."

The Amiga is now central to the work of Walter's production company. He uses it to do bookkeeping, production planning, even to correspond with Mr. Bill's fans. He's done a series of letterhead designs on the Amiga and prints out different ones, depending on the project. He also has a Kaypro 2000 portable, which he uses primarily for screenwriting, and uses the Amiga Transformer so he can use some programs on both computers. "The computers," he says, "are a key part of the whole operation. They let me keep things down to a manageable size, and they let me live and work where I want."

Video, Sluggo, and Other Stuff

How about future projects on the Amiga? Walter did a music video for the dB's and is working on others, incorporating Amiga images with live footage. "The Amiga can produce effects that would cost hundreds, maybe thousands of dollars in a post-production facility, and I can do them at home, even in the middle of the night."



Walter Williams, Bob Rose, and Jim Wilson

How about a game for the Amiga? Walter designed a Mr. Bill game with DataAge for the Atari game machine, but the company went bankrupt before it was produced. It was picked up by Datasoft and redesigned in a computer software version, but Datasoft went under, too. The game market may be shaky but there is nothing wrong with the game and Walter thinks the Amiga would be perfect for it. How is it played? "It's an adventure/strategy game called *Mr. Bill's Neighborhood.* You are Mr. Bill, trying to save your Mom, Spot and Miss Sally from the neighborhood bully, Sluggo. Obviously, Mr. Bill lives in a bad part of town."

Prime-Time Amiga?

Finally, Walter would like to explore more sophisticated animation. "The design of my new character was only done on the Amiga as a way of showing how he would look and act. He really isn't meant to be animated. However, I feel there is a character and a style which will make this form of animation legitimate for television. I can imagine doing a half-hour show for TV, using the Amiga for both sound and visuals, combined with audio and video post-production.

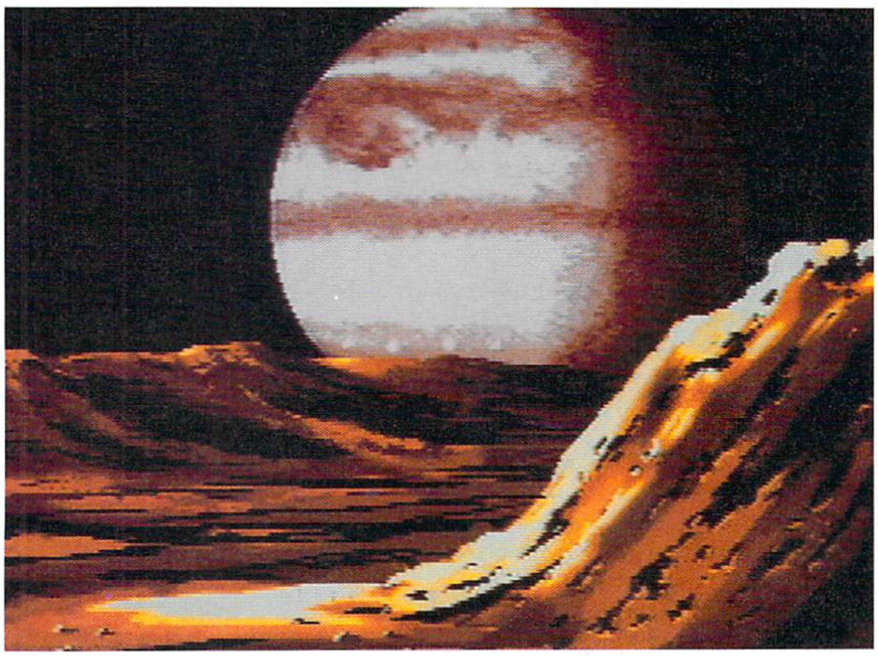
"With this machine, the sky (or at least the RAM) is the limit!"■

Walter Williams lives in New York. In addition to his new character, he is developing a live-action Mr. Bill series with Shelley Duvall. Address author correspondence to Melanie Ingalls at 400 W. 25th St. #3A, New York, NY 10001.

Astronomical Art and the Amiga

By Joel Hagen

Astronomical art occupies a fascinating territory where the boundaries of art and science overlap. The Amiga meets both the technical and creative needs of a new generation of artists who are exploring the frontiers of the solar system.



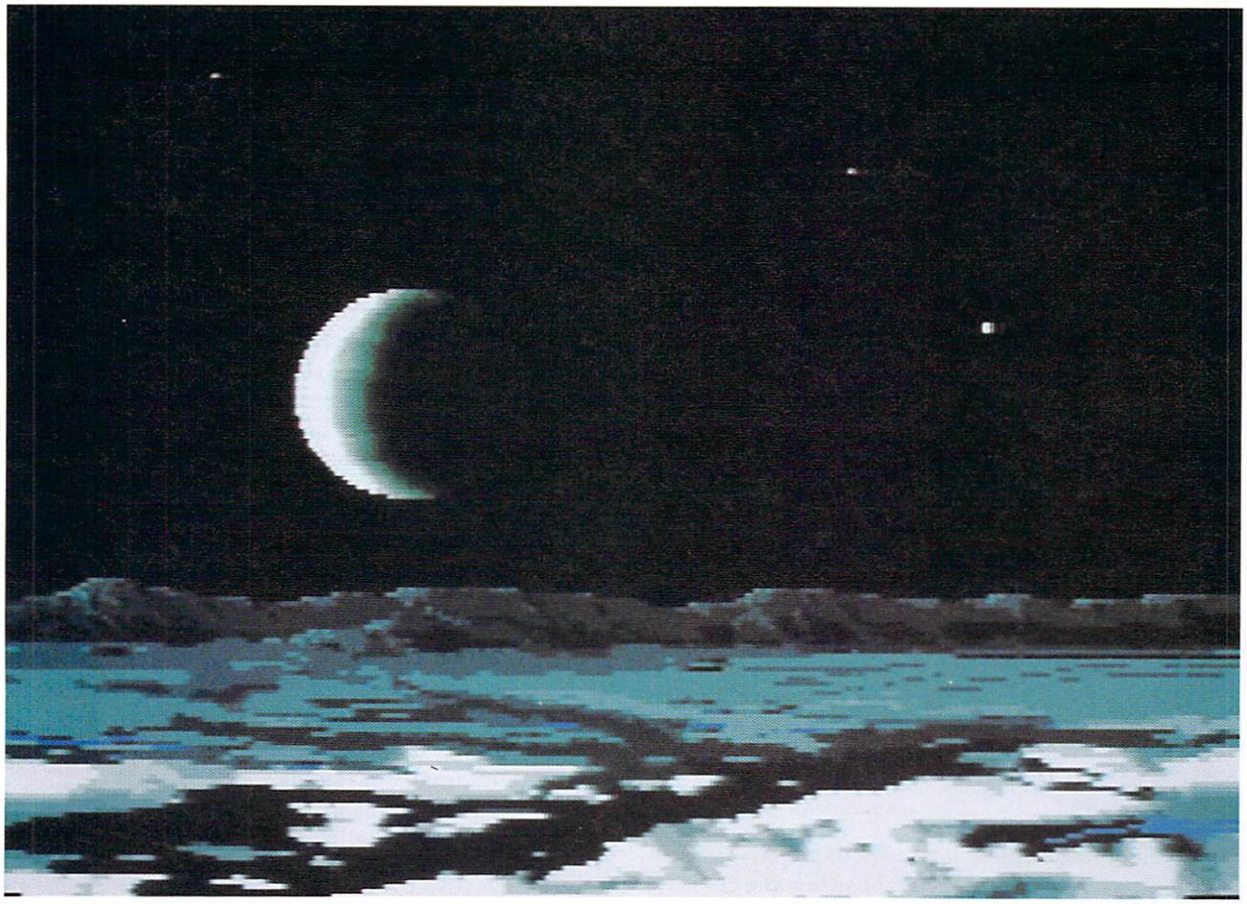
1. Jupiter from caldera on Io.

In late January of this year, the Voyager 2 spacecraft flew past the planet Uranus and its host of moons, returning their images to us across 2.8 billion kilometers of space. I was present at the Jet Propulsion Laboratory in Pasadena, California, the command and imaging center for the ongoing mission, during the days of data analysis following closest approach on January 24th. Using information from the daily press and science briefings, from conversations with geologists on the imaging team, and from the daily photo releases, I worked on an Amiga computer in the evenings doing astronomical paintings of what these newly-seen landscapes might be like.

Today, a generation of artists is exploring the opening frontier of space, much as Thomas Moran and his generation of landscape painters explored the frontiers of the American West in the 1800s. We look out on new worlds through computer terminals and the remote senses of sophisticated spacecraft. In painting these distant scenes, all available scientific information is used as a rigorous foundation from which to create accurate, dramatic renderings of the mountains, craters, canyons and skies of other worlds in our solar system.

New Tools

The advent of a personal computer as sophisticated as the Amiga places a new tool in the hands of astronomical artists, a powerful bridge between science and



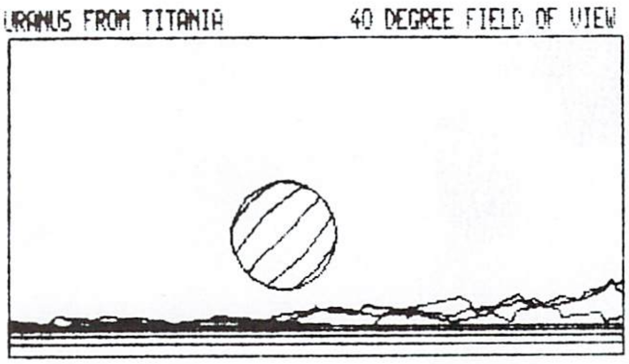
2. *Rift floor on Titania.*

art. The Amiga can accomplish all the calculations and schematics that must precede the rendering of a landscape, then provide the artist with enough graphics power to proceed with the illustration on the same machine. With slide rule or calculator, many computations are time consuming and repetitive enough to put a damper on an artist's inclination to try different orientations of elements within a painting. Building these formulas into self-tailored programs on the computer gives the artist freedom in moving his point of view in space, changing latitude, longitude or orbital position to find a dramatic composition of elements while the computer keeps the astronomical parameters accurate. The Amiga is faster and better at this than other computers I have worked with, but its real value to me as an artist is its graphics capabilities.

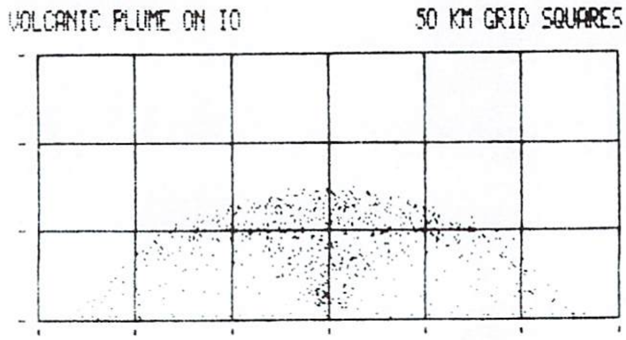
I have written astronomical art software that I have used frequently on other computers in developing my paintings. Normally, I use this software to arrive at a satisfying composition with planets, moons and landscapes represented schematically on the screen at correct sizes and orientations. I then translate this information into a sketch on canvas or illustration board and begin detailing geological features using NASA photos and other data as reference. In the past, the graphics capabilities of personal computers were far too limited for serious representational art. The Amiga changes that. This machine is capable of supporting the efforts of any serious artist. The range of 4,096 subtle color and value gradations and the screen density in high resolution of 640 × 400 pixels prove to be ample. I used Electronic Arts' DeluxePaint for the illustrations accompanying this article. This is a well thought-out program with unique features suited to some fundamental complexities of space art. Once I was familiar with using the graphics program, I found I could work very quickly on the screen and accomplish some things more easily than I can using paint and illustration board.

Using DeluxePaint

Illustration 1 shows a view of Jupiter calculated from the region of a small polar caldera on Io. This illustration was done in the low-resolution mode of 320 × 200 pixels. In that mode, the artist can build a palette of 32 colors from the available 4,096, as compared to 16 colors in hi-res. Astronomical landscapes tend to be fairly monochromatic, and I never felt limited by even 16 colors. I used one of DeluxePaint's most unique features extensively in this image. The SMEAR command allows me to sweep a brush of my own definition (a small circle or a long bar, for example) across an area of the image I have drawn. As this brush passes over color boundaries, it does something akin to pixel aver- ►



3. Uranus from Titania.



4. Volcanic Plume on Io.

aging, smoothing out the hard edge of the boundary by layering it with successive gradations from the color sequence in the palette. The result can be an overall smoothing, softening and smearing in the direction of movement of the brush. I used this to soften the banding on Jupiter, and to represent the look of sulphurous deposits in the caldera.

A powerful feature of DeluxePaint is the way in which the artist can build a palette of colors. For a representational rendering, it is important to have subtle shape and shade contours. The artist might want, for example, eight shades of a brownish gray, showing even gradations from very dark to medium bright for building convincing rock masses with shadow and highlight areas. This could be a daunting task if each color had to be separately constructed from its red, green, blue, black and brightness components. DeluxePaint allows the artist to do this if he wishes, but provides the option of building only the endpoints of the spread and letting the computer interpolate the others. My procedure has been to quickly build a red at one end, a green at the other, and have the computer interpolate 14 color stages between them. There are invariable interesting browns in the midranges. One of these can be used to create a spread by copying it to an endpoint where you darken it and then to another endpoint where you lighten it; you then create a range between the two.

This feature also allows the artist to change the colors in a finished illustration a dozen times to see if a new combination works better. Changing the palette changes the corresponding color in the painting. This is much like finishing a manuscript on a word processor, then experimenting with different printer formats until the look of the page is right. In fact, the analogy of a graphics package to a word processor is appropriate. The same labor-saving freedoms one has with a word processor as opposed to a typewriter are there for image creation in a good graphics package.

Advantages of Computer Graphics

There will always be advantages to using paint, brush and canvas. The artist has very fine control over detail, line quality, translucency of color, character of stroke and other subtle factors. However, it is important to accept and explore the advantages inherent to any medium, and there are many advantages to a computer graphics system like the Amiga's. For instance, it is easy to build up and tear down areas of an image with great flexibility. Cliff faces can be sketched up, trimmed back down in size, their profiles, slope and roughness radically altered, all without remixing colors to match or waiting for paint to dry. Switching keys on the mouse while drawing allows you to instantly paint cliff color into sky, or cut sky color back into cliff. This makes experimenting with the look of terrain features easier than with traditional materials.

Another great advantage of the computer system is its ability to save a painting at any state. Like a climber hammering in a piton before a risky move, the computer artist can save a picture to disk before typing a radical alteration of the image. He is not forced to risk ruining the image for the chance of enhancing it. This freedom is conducive to the experimentation and innovation fundamental to art. Another feature unique to computer graphics is the ability to magnify an area of an image, go into that area, and with precision, refine a contour or add a highlight, pixel by pixel.

Other features, such as the CIRCLE and ELLIPSE drawing commands, get a lot of use in placing planets and moons in the sky at accurate sizes. The ability to cut out a planet sphere once it is finished and move it behind the horizon to the desired spot is a luxury unknown to those working in oils and acrylics. Working speed and the freedom and flexibility to experiment stand out as strengths of the computer as an artistic tool. These graphic strengths, combined with its power to perform the calculations at the technical stage of a painting, make it an ideal system for exploring techniques of astronomical art.

Calculation and Speculation

Nine new moons were discovered by Voyager at Uranus, all small (from a few kilometers to 170 km across) and poorly photographed. The five previously known moons are—from the most distant inward—Oberon, Titania (each about 1,600 km in diameter, or half that of earth's moon), Ariel, Umbriel (each about 1,200 km) and Miranda (only about 500 km). Beautiful images were returned from all of these. The close-ups of Miranda may be the best shots taken so far during the nine years of the mission.

An awareness of the science behind the images is critical to the astronomical artist. Most solar-system images that the public is familiar with have had the color radically exaggerated to enhance structure for study. The artist must be aware of the extent to which his photo reference has been contrast- or color-stretched, lest he be misled and (as has happened) paint blue into the bands of Saturn. He must understand what the scale of an image is to evaluate the geological processes responsible for the feature, or how that feature may translate into the field of view of his painting. If he ignores the scientific information available to him, he has no real foundation upon which to build his aesthetic decisions. His paintings, while they may be pretty, become fanciful, and he is no longer within that fascinating shared territory of art and science.

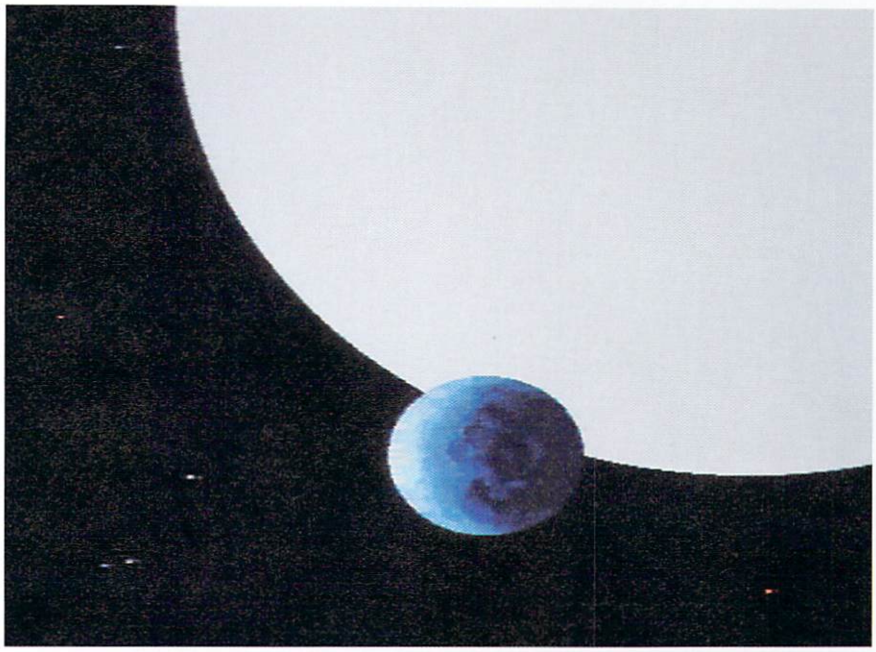
Data other than images will also reveal much about the look of a distant moon. The artist must use all possible sources. My illustration of a rift floor on Titania (Illustration 2) was done when the feature was barely visible in early Voyager images, before I had more information at hand about the nature of the surface. At that time, albedo differences (the relative percentages of light reflected) seemed to indicate that some bright icy floor might be logical. However, a statistical comparison of reflected photons at two different phase angles of sample now tells us that Titania has a highly porous surface of pulverized rock. This is not evident in the photos.

Before rendering the landscape of Titania, I needed some fundamental calculations in order to depict Uranus in the sky. For example, its size must be determined in units meaningful to a visual representation. The diameter of Uranus is about 50,800 km. By calculating its angular diameter (i.e., how many degrees of the sky it occupies), it can be given an accurate size in the painting. Trigonometry can solve for angular diameter. Think of the radius of Uranus (25,400 km) by the distance to Titania (438,000 km) gives .058. Taking the arcsine of this gives 3.32 as the angular radius, or 6.65 degrees angular diameter.

I now elect to work within a certain field of view, thinking of the width of the painting in degrees rather than centimeters or inches. If I hold out my arms to the sides and look from left hand to right, I am obviously seeing 180 degrees, one half a circle. This is too wide an angle for an effective landscape painting. Ophthalmologists I have talked with feel that the human eye draws most of its information from a 30-degree cone of vision. A camera with a standard 50mm lens takes in about a 40-degree wedge. I usually work in this 30- to 40-degree range as a familiar, non-deceptive frame of reference for the viewer. So, if the field of view of the painting is 40 degrees and the width of the painting will be 18 inches, we divide 40 degrees by Uranus' 6.65 degrees to get 6.02. Eighteen inches divided by 6.02 gives 2.99, about a three-inch diameter circle to accurately represent Uranus' size. Uranus is an oblate spheroid and must actually be represented by a slight ellipse. In doing a series, such as the moons of Uranus, I stick



5. Cliffs on Miranda.



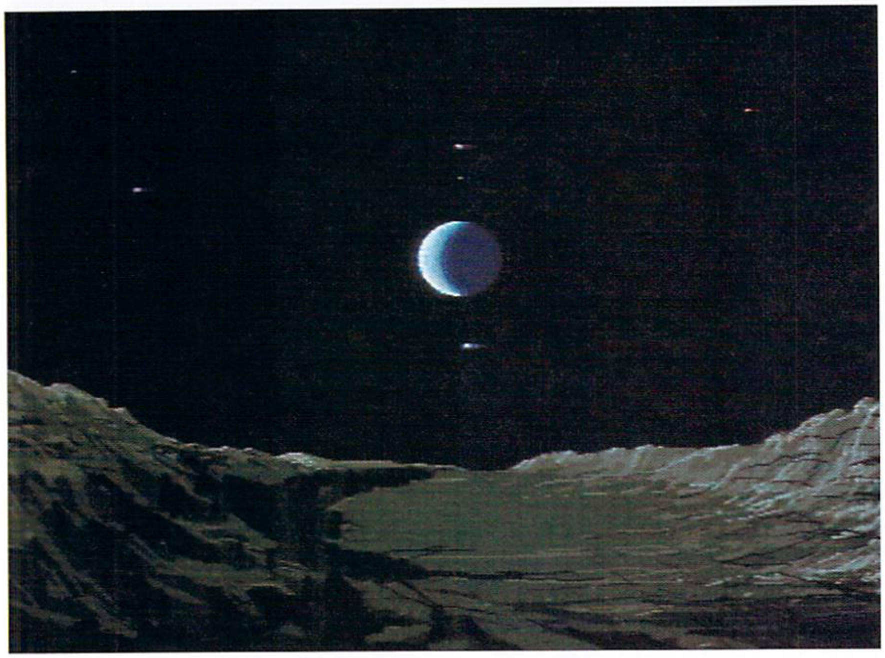
6. Moon 1985U1.

to a consistent field of view in order to give a true relative feeling for sizes and distances within a system.

My own astronomical art program performs these operations for me, giving me both a graphic representation of what I have asked for and a page of pertinent information adjusted to the conditions I have given it. Illustration 3 shows Uranus from Titania in a 40-degree field as drawn by my astronomy program. To work directly from the diagram of Titania into a DeluxePaint image, I need only set the picture width to the horizontal dimension of the intended graphic mode, in this case 320 for lo-res. The dimensions my program feeds out are now measured in pixels, and I can use the Coordinates option of DeluxePaint with its ELLIPSE drawing command to make Uranus the precise size and shape. ►



7. Graben channel on Ariel.



8. Crater floor on Oberon.

◄ I have data for the entire solar system built into the program to give me great flexibility to move around in space without looking up numbers. I can call up not only views of planets from the surfaces of their moons, but combinations of planets and moons in space, their oblateness and relative axial tilts calculated and graphically represented. From the surface of a moon, I am quickly told by the program exactly how much of the planet's polar regions are visible at that distance (for example, whether I will be able to plausibly show Mars' polar ice caps from its closest moon, Phobos). I can select precise latitude and longitude coordinates for mapped features on a moon, such as the volcanic feature Pele on Jupiter's active moon, Io. Trigonometric formulas built into my program tell me if Jupiter will be visible in the sky, and if so, at what height above the horizon and with what degree tilt of its equator and banding.

I can press a button and have the computer build the profile of a volcanic plume on Io, such as was seen earlier in Voyager's journey when it passed through the Jupiter system. The striking umbrella shape (Illustration 4) is a fountain of parabolic arcs whose extent is calculated from known gravitation, angles of ejection and velocities. Printed out, these profiles can be used as templates for airbrushing an accurate plume into a painting. I can call up ballistic trajectories for any body in the solar system. This can tell me, for example, how far an astronaut could jump on Miranda. From this I could judge how far apart his footprints might be if I were to choose to render them in order to show the effect of disturbing the thin, dark surface of that tiny moon. In this case, I find that under the weak gravitation of Miranda, a man could jump hundreds of meters. It would be nearly impossible for him to even try to produce a line of footprints. A tempting visual idea which doesn't fit the science, it must be saved for a heavier gravity moon.

Miranda has some of the most complex geology yet encountered in the solar system, a patchwork of heterogeneous features on a world only 300 miles across. Miranda may have been shattered by an impact in its past and reaccreted, creating the unique jumbled surface. Complexes of terraces, cliffs many kilometers high and baffling angular features make this a compelling landscape for the space artist to explore. I used hi-res to illustrate an area of steep cliffs and gorges (Illustration 5). The smoother curves and finer detail of this grahics mode are evident. The moons always keep the same face toward Uranus, locked by tidal forces from the planet. This is common throughout the solar system. One significance of this to the space artist is that the planet remains fixed in the same position in the moon's sky. If you look above the horizon at a certain latitude and longitude and the planet is not in your field of view, it never will be.

The only close-up photo of one of the newly discovered moons is of 1985U1, well inside the orbit of Miranda and about 170 km in diameter. I did a speculative illustration of the moon against Uranus' bright disk in hi-res mode (Illustration 6).

Ariel has huge, graben-like features and wide faults apparently filled with some smooth flowing material. In Illustration 7, I speculate on what the floor of one of those valleys might be like at a point of intersection with another fault. I used a shading function on the far cliff to knock the values down in such a way as to give a slight look of stratification. I do not show the rings of Uranus. They are thin and composed of some of the darkest material in the solar system. Soot reflects more light than does the ring material. I think it unlikely we would see them with the naked eye, even acclimated to the low light level only one quarter of one percent earth normal. The crescent phase Uranus was easy to do with the ELLIPSE command, cutting a clean bite out of the disk and smoothing the terminator (shadow line) with the SMEAR command.

Orbiting farthest out from Uranus is Oberon. Impact craters show bright rays thrown out across the surface and crater floors filled with some darker substance. In Illustration 8, I used hi-res to create this view of a fractured and slumping filled crater floor. Uranus in the sky is flanked on its equatorial plane by three of its moons. Being able to work with consistent colors in dark values allowed me to retain the clarity of features in deep shadow areas. I reworked them many times experimentally with an ease I would not have had using paint and brush.

We are privileged to be the one generation that sees new worlds in our solar system for the first time. As an astronomical artist, witnessing the Voyager's encounter with Uranus was an unforgettable experience. Part of the joy of that experience has been the ability to work immediately on visualizing those new worlds with a tool allowing me such smooth interplay between my technical and artistic needs. Like the scientist exploring through the numbers, astronomical artists explore through any new piece of information. They try any new artistic tool. They visit any unusual landscape they can study for geological analogies. On a foundation of science, the artist proceeds to build something more. He searches for drama in the data, for grace in the terrain. He seeks to isolate these and find a perspective from which their beauty is clear.■

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aquamarine pastels), and a new room will be added to the Vice station—a tech room with all manner of sophisticated gadgetry. When we spoke, Bob Lacey's plans were to incorporate three Amiga's (possibly painted black) into the tech room and maybe use one in the surveillance van, the bright green van with the giant bug on top, cleverly referred to on Miami Vice as the "bug van."

Mug of the Week

The Amigas would be shown displaying screens of mug shots or of mug shots being composed (probably digitized pictures of the guest-star "criminal of the week," or screens combining text material and digitized pictures, or maybe screens with images from remote video cameras (for surveillance, etc.). With the Amiga's graphics programs and video compatibility, it should very successfully give the appearance of technical sophistication desired by the show's decorator. Maybe Don Johnson or Phillip Michael Thomas will walk over and punch a button or click the mouse and call up a digitized image of the episode's evil drug-smuggling social menace, who knows, maybe. . . Frank Zappa.

Boosting the Ratings

In the offices at *AmigaWorld*, there are mixed feelings about Miami Vice, in general. The opinions range from "very cool" and "slick" to "Why doesn't Don shave once in a while?" (I'm from Florida and I never knew *anyone* who had a pet alligator! But I do watch the show—in New Hampshire in about February it's soothing for me to see palm trees and pelicans.) However, all opinions aside, we look forward to the attention this might bring to our favorite computer (the press has been myopic, if not blind, in its coverage of the Amiga), and the fact that this implies that the Amiga is justifiably perceived as the vanguard of new micros. Miami Vice is definitely a high-gloss show using first-rate, state-of-the-art techniques, and we feel the same way about the Amiga.

"Who Cares?"

Maybe you could care less about whether the Mac is used on Moonlighting, or the Amiga is used on Miami Vice, but there is often something behind the way these micros are chosen for use on these shows. A Mac, the standard yuppie computer, is often seen on a clever, sophisticated adult comedy—fitting; likewise, an Amiga, the turbo-micro dream-machine, appears on a show known for its outstanding flash, color, music and artistic trend-setting filming.

For various reasons, aesthetic and self-serving, we are unashamedly hoping the Amiga is a part of Miami Vice's new 1986 season "look." I've heard a very impressive stereo version of the theme from Miami Vice created on the Amiga with Musicraft. I may dig out my best tropical-motif shirt and my old flip-flops and wear them to work. Maybe in the future we'll publish parameters for getting the Amiga to sound like Don Johnson. I can hear it now, cigarette hanging from the disk drive, "Okay Pal, party's over, hang it up before I turn you into shark bait. . . ."■

"rotating" effect; although it's not the smoothest animation possible with the Amiga, it certainly shows how useful the AREA command can be.

```
ANIM:
CLS
FOR X = 10 TO 150 STEP 2
  AREA (X,Y)
  AREA (150,10)
  AREA (160 – X,150 – X)
  AREA (10,100)
  AREAFILL
  FOR D = 1 TO 16:NEXT
  CLS
NEXT
FOR X = 150 TO 10 STEP  – 2
  AREA (X,Y)
  AREA (150,10)
  AREA (160 – X,150 – X)
  AREA (10,100)
  AREAFILL
  FOR D = 1 TO 16:NEXT
  CLS:NEXT
GOTO ANIM
```

PATTERN and PALETTE

When you issue an AREAFILL command, the points you've defined with AREA are connected, and a solid polygon is formed. You can change the pattern used to fill the polygon or to make the lines of its border with the PATTERN command for such applications as making distinct textures for bar graphs or creating more realistic graphics.

The pattern you create is stored with a numeric array. This array must consist of a number of elements equal to some power of 2; therefore, you can make a pattern with 2, 4, 8, 16, 32, etc. elements. Each of these elements should be a decimal or hexadecimal number that establishes which bits (pixels) in a pattern are "on" (equal to 1) and "off" (equal to 0). Therefore, if you want a pattern that is made up of two elements with the following pixel conditions:

```
0000000011111110
0000000000000001
```

your two elements would be 254 and 1, since these are the corresponding decimal numbers to the above two binary numbers. You could use these decimal numbers, or you could translate them into hexadecimal and precede them with &H to indicate that you are working with base-16 numbers.

Once you know what your elements are, store them in an array; for instance, if you want to use an array called TEXTURE%() for the two elements above, you would type:

```
TEXTURE%(0) = 254
TEXTURE%(1) = 1
```

The format for the PATTERN command is:

PATTERN [*line pattern*] [*,area pattern*]

and the "area pattern" is where you specify the array in which your pattern elements are stored. The "line pattern" is another number made up of 16 bits, which can either be hexadecimal or binary; this number will tell the computer what type of pattern to use when drawing the border of a polygon.

This next program demonstrates the PATTERN command by setting up four random elements for the pattern, giving the PATTERN command, filling the random polygon area with AREAFILL, and then repeating the process again. This will create random overlapping polygons, each with a different random pattern.

```
DIM AREA.PAT%(3)
THERE:
  FOR X = 0 TO 3
  AREA.PAT%(X) = RND*3000
NEXT
PATTERN &HFFF,AREA.PAT%
FOR X = 1 TO 5
  AREA (RND*600,RND*180)
NEXT
AREAFILL
GOTO THERE
```

This next program is even more unusual since it keeps using the same polygon, yet the pattern keeps changing within the polygon:

```
CLS
DIM AREA.PAT%(1),P(14)
STRANGE:
  AREA.PAT%(0) = RND*32767
  AREA.PAT%(1) = RND*32767
  PATTERN &HFFF,AREA.PAT%
IF D = 1 THEN GOSUB ROUTINE:GOTO STRANGE
FOR I = 1 TO 6
  P(I) = RND*500:P(I + 6) = RND*180: AREA
  (P(I),P(I + 6))
NEXT
AREAFILL
D = 1:GOTO STRANGE
ROUTINE:
  FOR L = 1 TO 6
  AREA (P(L),P(L + 6))
  NEXT L:AREAFILL
RETURN
```

The last command we're going to examine is PALETTE, which allows you to access any of the 4,096 colors of the Amiga. If you have an analog-RGB monitor, you can really take advantage of this command, but the different colors are too subtle for a normal color television to display properly. In order to use PALETTE, simply follow the command with the color number you want to use (in this case, we'll be using color number 1), followed by the three numbers representing the red, green and blue levels of the color you want to create. These color levels can range from 0 to 1, so PALETTE 1,0,1,0 would make color 1 completely green, while PALETTE 1,1,0,0 would make color 1 completely red. The following program uses three FOR...NEXT loops to show off the colors of the Amiga computer:

```
LINE (0,0)-(200,200), 1, BF
FOR R = 0 TO 1 STEP .01
  FOR G = 0 TO 1 STEP .01
    FOR B = 0 TO 1 STEP .01
      PALETTE 1,R,G,B
    NEXT
  NEXT
NEXT
```

The SLEEP command in this next program will make the computer wait until a key or mouse button is pressed, or until some other action occurs. When some kind of input is received, the computer will go back to its routine that randomly changes the background and text (foreground) colors:

```
REPEAT:
  PALETTE 0,RND,RND,RND
  PALETTE 1,RND,RND,RND
  SLEEP
GOTO REPEAT
```

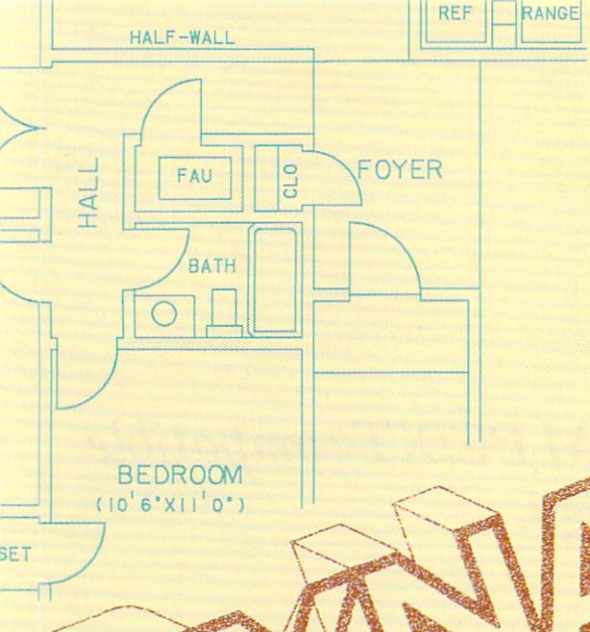
Lastly, here's a fun little program that will let you type into the keyboard while the foreground and background colors change randomly with each press of a key:

```
REPEAT:
  PALETTE 0,RND,RND,RND
    KEY:
      A$ = INKEY$:IF A$ = "" THEN KEY ELSE
      PRINT A$;
GOTO REPEAT
```

Using Graphics

Although we've only explored the fundamentals of Amiga Basic's graphics commands, this should give you a solid foundation for writing your own graphics programs. After you've mastered the commands described here, study the Amiga Basic manual so you can learn more about these and other commands. Pictures, diagrams, bar and pie graphs, animation and games are just a few of the possibilities of Amiga's graphics; after you've been experimenting with your computer for a while, you'll probably find quite a few others. We'll explore one of these techniques—animation—in our next installment.■

Address all author correspondence to Tim Knight, 1027 The Alameda, Suite 160, San Jose, CA 95126.



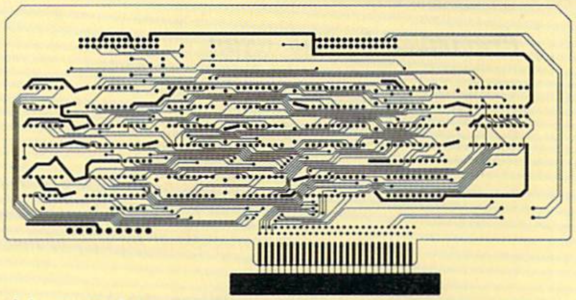
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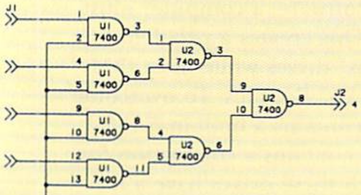
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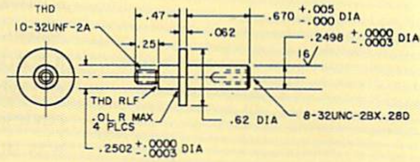


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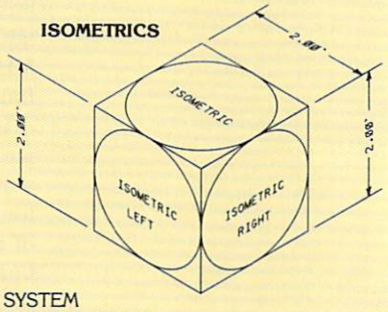


SCHEMATICS



MECHANICAL DRAFTING

ISOMETRICS



SIGNAL NAME	COMP NAME	PIN NUMB	SOURCE	TYPE COMP
S0001	J1	2	*	CON
S0001	U1	1		7400
S0002	J1	3	*	CON
S0002	U1	4		7400
S0003	J1	4	*	CON
S0003	U1	9		7400
S0004	J1	5	*	CON
S0004	U1	12		7400
S0005	J1	9	*	CON
S0005	U1	2		7400
S0005	U1	5		7400
S0005	U1	10		7400
S0005	U1	13		7400
S0006	U1	3	*	7400
S0006	U2	1		7400
S0007	U1	6	*	7400
S0007	U2	2		7400
S0008	U1	8	*	7400
S0008	U2	4		7400
S0009	U1	11	*	7400
S0009	U2	5		7400
S0010	U2	3	*	7400
S0010	U2	9		7400
S0011	U2	6	*	7400
S0011	U2	10		7400
S0012	U2	8	*	7400
S0012	J2	4		CON

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Amiga Sidecar

Commodore announces an IBM PC/XT-compatible coprocessor system for the Amiga.

Previewed by Bob Ryan

Editor's note: This preview was written with information supplied by Commodore Business Machines. It is a report on the announced features of the Sidecar, not a hands-on review.

When the Amiga was launched in July, 1985, Commodore made a big deal about the Transformer—a software emulator that would allow you to run IBM PC software on the Amiga. When the Transformer finally showed up (about six months late), it was apparent that a software emulator was a very limited solution for people who wanted to run MS-DOS on the Amiga (see our review of the Transformer on page 97). Commodore was under pressure to make good on their promises of PC compatibility. Their answer is the Amiga Sidecar.

First shown at COMDEX/Atlanta, the Sidecar is a PC clone in a box, or, more accurately, a PC/XT clone in a box. The box attaches to the Amiga via the expansion bus on the right side of the computer. The Sidecar contains an 8088 microprocessor running at 4.77 MHz—the same processor and the same clock speed found in the IBM PC and PC/XT.

Using the same microprocessor doesn't ensure compatibility, however, so the Sidecar also uses BIOS ROMs that are compatible with the PC/XT BIOS. BIOS stands for Basic Input/Output System. It consists of a number of routines that control how software reads the keyboard and, most importantly, how software writes to the display screen. The BIOS in the Sidecar was written by Phoenix Software Associates, a company that has acquired a solid reputation for being able to duplicate the functions of the IBM PC BIOS without infringing upon IBM's copyrights.

Memory and Math

The Sidecar comes with 256K bytes of memory. This is expandable in the box to 512K, although additional memory can be added via the Sidecar's built-in expansion slots. The Sidecar also contains a socket for an 8087 math coprocessor, which can greatly increase the execution speed of computation-intensive applications.

You will also find a cooling fan built into the Sidecar, as well as a speaker. The Sidecar can make any sounds the IBM PC can.

Disk Dilemma

In order to run IBM PC software, a computer must be able to read IBM disks. This creates a problem for the Amiga because it has 3.5″ drives while most IBM software is distributed on 5.25″ floppies. To overcome this limitation, the Sidecar contains a built-in 5.25″ drive and controller. It also contains a connection for an external 5.25″ drive. Both these drives have a formatted capacity of 360K bytes.

The Sidecar also has three IBM-type expansion slots. One of these slots is reserved for a hard-disk controller, while the other two are available to any IBM expansion card. Because it may have to power a hard disk, the Sidecar has its own power supply, which means that it doesn't have to draw power from the Amiga.

I/O Hardware

The Amiga Sidecar doesn't have its own keyboard and monitor; it uses those of the main computer. It can also use the Amiga's built-in serial and parallel ports, as

►

well as any disk drives that you have connected to your system. Your Amiga floppies have a formatted capacity of 760K when running under MS-DOS.

Although the Sidecar uses the Amiga's monitor as its display device, it won't tie up your system. The Sidecar runs MS-DOS in an AmigaDOS window, with MS-DOS simply becoming another task that can be run concurrently with Amiga native-mode software. You can choose between an IBM monochrome display or an IBM color display for the Sidecar. In color mode, you can change the four IBM colors into four of your own choosing.

Sharing Resources

The Sidecar is not simply an IBM clone. You can also use it as an expansion chassis for your Amiga. Commodore has stated that they will release a 2MB memory board for the Sidecar. The board will be available as main-memory expansion for the Amiga and as a RAM disk for MS-DOS applications. In addition, any hard disk you install in the Sidecar can be partitioned: You can dedicate some space to AmigaDOS and the rest to MS-DOS storage. AmigaDOS 1.2 supports disk partitioning as well as the use of the Sidecar's 5.25″ disks by AmigaDOS.

Some resources are not shared by the Amiga and the Sidecar. The 512K internal memory in the Amiga is not available to the Sidecar. But touché!, the Sidecar's internal 512K can't be accessed by the Amiga, either. At this writing, it is unclear whether the Amiga's mouse/joystick ports can be used by MS-DOS programs running on the Sidecar.

Commodore has also announced that they are working on a scheme to allow data sharing between MS-DOS and AmigaDOS. Whether this would include actual file sharing or just file-transfer capabilities is unclear. In any event, the ability to move data easily between MS-DOS and AmigaDOS applications will increase greatly the utility of both systems.

Winter Arrival

The Amiga Sidecar is expected to hit your dealer's shelves in December. Although this is over a year since Commodore promised a viable MS-DOS option for the Amiga, the Sidecar may be worth the wait. If it satisfies both the needs of people who want to run MS-DOS and those who want to expand their Amiga, it will quickly become the most popular peripheral for the Amiga.

To make any impact at all, the Sidecar is going to have to be sensibly priced. As yet, the only word from Commodore is that it will be priced "significantly below $1000." But all that says is that it will cost somewhere between $0 and $999. If you can believe rumors, then the Sidecar will retail for about $600. This is about the going price for less-expensive IBM clones. If Commodore can supply the Sidecar—a combination IBM clone and Amiga expansion chassis—for under $600, they will sell a lot of them. Sell the Sidecar for less than $400, and they may not be able to build enough Sidecars—and Amigas—to satisfy the demand.■

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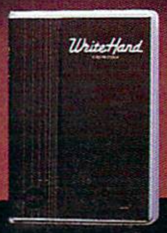


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Using Libraries from Amiga Basic

By Louis R. Wallace

Amiga Basic is a full-featured language that supports most of the abilities of the Amiga. Developed by Microsoft, it was adapted from the already advanced versions of Microsoft BASIC used by the IBM and Macintosh computers. A large number of additions were made in order to take advantage of the special nature of the Amiga, notably in the areas of graphics and animation. However, it's not surprising that they did not incorporate every feature of this very complex machine in a directly accessible manner.

There are literally hundreds of specialized subroutines built into the Amiga's ROM and on disk-based libraries. These are the very same routines used by C or 68000-assembler programmers on the Amiga, and many of them are called by the Amiga Basic interpreter in order to utilize the built-in Basic functions and commands. But there are some things that are not implemented directly by Amiga Basic, and you must use less direct methods in order to access them from your Basic programs.

For example, Amiga Basic has two special commands for disk operations. These are FILES and CHDIR. FILES is used to get a directory from Basic, and CHDIR allows you to move to another disk device or subdirectory. However, you cannot easily send other AmigaDOS commands from within your programs. For example, it would be useful to be able to create new directories or send data files to the printer from Basic, just as you can from DOS. Or perhaps you wish to multitask another program from your Basic programs. Maybe you need some special graphics, animation or Intuition function not supported by Amiga Basic. What do you do?

The answer lies in the ability of Amiga Basic to use the command CALL to access a library routine. It is very similar to calling machine-language routines, with parameters passed in the same manner as in C.

For the Basic programmer to use these libraries, he must first know what libraries exist and what routines are contained within them. The only libraries mentioned in the Amiga Basic manual are the DOS and graphics libraries, and what useful routines they contain are not mentioned. The real source of information is the Amiga ROM Kernel Manuals, volumes 1 and 2. These two books contain around 2,000 pages of information on the Amiga, and much of it concerns the Amiga libraries and ROM routines. (These manuals are available from Addison-Wesley.)

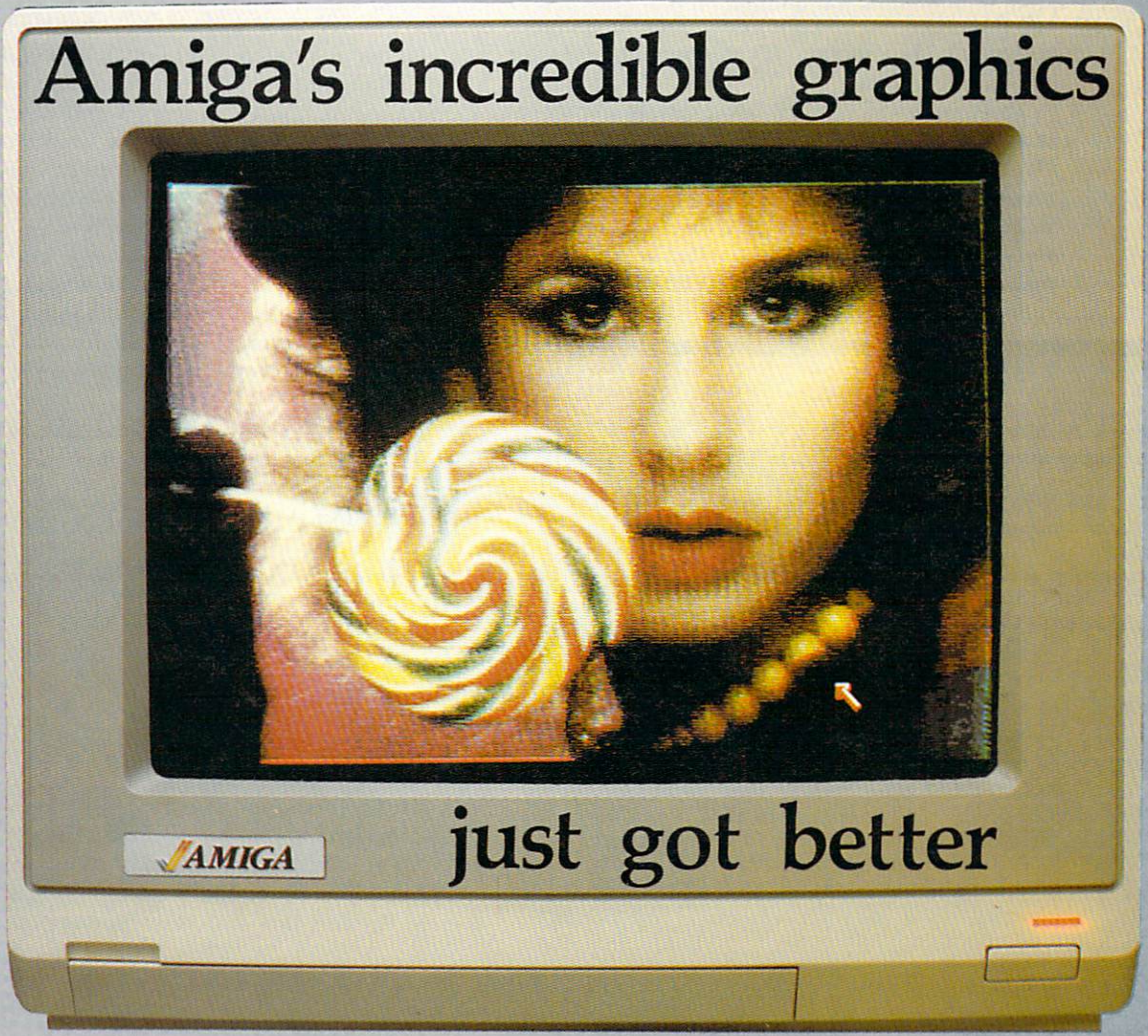
There are many libraries you can use from Amiga Basic. Associated with these libraries are special files that describe to Amiga Basic the parameters required and where they are within the library. They are called .fd files, and they can be found on the Amiga 68000 Assembler disk and the Lattice and Aztec C compiler disks. They are ASCII (text) files that list the routines in the library and the parameters required for each routine. The 16 .fd files are listed below.

clistlib.fd
consolelib.fd
diskfontlib.fd
doslib.fd
execlib.fd
graphicslib.fd
iconlib.fd
intuitionlib.fd
layerslib.fd
mathffplib.fd
mathieeedoubbaslib.fd
mathieeesingbaslib.fd
mathtranslib.fd
potgolib.fd
timerlib.fd
translatorlib.fd

Before you can begin using the routines in the .fd files, Amiga Basic requires you to convert them to a slightly different form called .bmap files. These can be generated by using the program called CONVERTFD, found in the BASICDEMOS subdirectory on your Amiga Extras disk. This program will create the proper file for use by Basic and store it in the system directory called libs:.

To convert a file from .fd to .bmap, copy the .fd files you wish to convert to the directory that contains CONVERTFD, usually the BASICDEMOS directory of the Amiga Extras disk. Load Amiga Basic, then load and run CONVERTFD. It will ask you the name of the .fd file to convert. Using the graphicslib.fd as an example, you would then type in the complete name "graphicslib.fd". It will then ask for the name of the .bmap file to ►

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◄ call the converted file. You would type in "graphics.bmap". The program will then create the .bmap file to be used by Basic.

There is a conflict when using certain library commands from Amiga Basic (e.g., commands like INPUT, OPEN, READ, ATN and others that have a direct counterpart in Basic). Amiga Basic will tokenize the commands when writing the .bmap file, causing incorrect results when you attempt to use it. The solution is to make a new version of the CONVERTFD program, called NEWCONVERTFD.

Listing 1.

```
REM Using Libraries from Amiga basic
REM Part One Change basic text font style


DECLARE FUNCTION AskSoftStyle& LIBRARY

  LIBRARY "graphics.library"

  enable%=AskSoftStyle&(WINDOW(8))

  FOR i%= 0 TO 7
      ChangeStyle i%
       IF i%=0 THEN PRINT "If 0 then text is normal."
       IF i%=1 THEN PRINT "If 1 then text is normal underlined."
       IF i%=2 THEN PRINT "If 2 then text is bold."
       IF i%=3 THEN PRINT "If 3 then text is bold underlined."
       IF i%=4 THEN PRINT "If 4 then text is italic."
       IF i%=5 THEN PRINT "If 5 then text is italic underlined."
       IF i%=6 THEN PRINT "If 6 then text is bold italic."
       IF i%=7 THEN PRINT "if 7 then text is bold italic underlined."
      PRINT
  NEXT i%

  ChangeStyle 0   ' return to normal font style

  LIBRARY CLOSE     ' close graphics library

END ' rem end program

SUB ChangeStyle(mask%) STATIC
  SHARED enable%
  SetSoftStyle WINDOW(8),mask%,enable% ' call
END SUB
```

Listing 2.

```
REM Using Libraries from Amiga basic
REM Part Two Send CLI commands


DECLARE FUNCTION Execute& LIBRARY     ' only useful from CLI

  askquestions:

  LIBRARY CLOSE
  command$="":answer$="":query$="":x=0
  INPUT "What CLI command";command$
  INPUT "Do you need data back (y/n)";answer$

  IF answer$="n" THEN CALL CLIStuff (command$)
   ELSE CALL CLIReturn (command$)

  INPUT "Do you wish to send another CLI command y/n";query$
  IF query$="y" THEN askquestions

END
```

Listing continued on next page.

In order to save space for other examples in this article, we will not give the entire listing of NEWCONVERTFD. (After all, CONVERTFD is on the Amiga Basic disk.) Instead, I will tell you where to add a few lines that will take care of the needed changes.

First, load Amiga Basic. Then in direct mode (*not* within the list window), type CHDIR "BASICDEMOS", which will change you to the directory that contains CONVERTFD. You may then type LOAD "CONVERTFD", which will load the program for editing. The program will load and the list window will open, showing the program. Point to the list window with the mouse and click the right button once to enter the list window.

You will need to add several lines to the program. The first new lines should follow the line:

```
DEFINT A-Z 'by default, all variables are integer
```

On the line starting *after* this line, type:

```
READ CNT
DIM CON$(CNT)
FOR K=0 to CNT-1
  READ CON$(K)
NEXT K
```

This will read in the data we will add at the end of the program into the array CON$. The next change is in the subroutine called GotFunction, which is 30 lines below our newly added lines.

The first line of GotFunction is this:

```
GETTOKEN ' TOKEN$=FUNCTION'S NAME
```

Immediately *following* this line, add these lines:

```
K$=TOKEN$
FOR K=0 TO CNT-1
  IF K$=CON$(K) THEN TOKEN$="X"+TOKEN$
NEXT K
```

The next change is in the subroutine Bad file format. Change the word STOP to CLOSE and change the word RETURN to STOP.

Finally, at the very end of the program (following the subprogram GETCHAR), add these lines of data:

```
DATA 11
DATA ABS,CLOSE,EXIT,INPUT,OPEN,OUTPUT
DATA READ,TAN,TRANSLATE,WAIT,WRITE
```

When typing the DATA statements above, please be careful to use the same case (upper or lower), as it is very important. That completes the needed changes. To save it to disk, type (outside the list window):

```
SAVE "NEWCONVERTFD"
```

which will save the new version to disk. This should now be used to convert the .fd files to .bmap files. As it converts them to .bmap form, it will check for the com-

mands in the data statements, and when those subroutine names are found, they will then have the letter x added to the beginning of their name. When you CALL these routines, it will be necessary to call them by this new name (e.g., xClose or xInput).

In the same directory with CONVERTFD are the .bmap files graphics.bmap and dos.bmap. The .fd files are not on the disk, however. Since you may not have the ROM manuals and you won't know what routines are in them, these two .fd files are listed on pages 53–55.

In order to access library routines from Amiga Basic, it is necessary to first open the specific library that contains the routine you want to use. To open the library, use the statement LIBRARY followed by the library name.

LIBRARY "GRAPHICS.LIBRARY"

This will make the graphics library available to Amiga Basic, and you can take advantage of it from within your programs.

For example, let's look at a simple demo (Listing 1) that uses the graphics library to change the SoftStyle of the font in memory. SoftStyle indicates what form the font is, such as regular, bold, italic or underlined. We can easily use the library routine called SetSoftStyle in the graphics library to do this.

Let's walk through this program. The first line is:

DECLARE FUNCTION ASKSOFTSTYLE& LIBRARY

This command is merely a directive to Amiga Basic that says I will be asking for a returned value from the library routine AskSoftStyle. The trailing "&" character indicates the type (in this case a long integer) of the returned value. This is necessary for all returned values from a library call.

Next, we have the statement:

LIBRARY "GRAPHICS.LIBRARY"

which opens the graphics library for use by Basic. (We can have up to five libraries open at once.) Next is the statement:

ENABLE% = ASKSOFTSTYLE&(WINDOW(8))

which returns a long integer value that contains the soft-style bits of the current font. The WINDOW(8) function returns the current RASTPORT (which means the current display window).

Then we have a FOR...NEXT loop that contains a call to the subprogram ChangeStyle. We pass a number from 0–7 with the call. This number indicates what form we wish the font to be. Within the subprogram, we have the actual call to the library routine SetSoftStyle. This routine requires three parameters, the RASTPORT, a mask (0–7) and the soft-style bits contained in ENABLE% (which was returned by the call to AskSoftStyle).

By using this technique from within your programs, you can quickly and easily change the font style, adding ►

Listing continued from previous page.

```
SUB CLIReturn (command$) STATIC
  LIBRARY "dos.library"
  x=Execute&(SADD(command$+" >ram:temp"+CHR$(0)), 0, 0)
  OPEN "RAM:temp" FOR INPUT AS 1
  WHILE NOT EOF(1)
    LINE INPUT #1,a$
    PRINT a$
  WEND
  CLOSE
  KILL "RAM:temp"
END SUB

SUB CLIStuff (command$) STATIC
  LIBRARY "dos.library"
  x=Execute&(SADD(command$+CHR$(0)), 0, 0)
END SUB
```

DOS_Lib.fd

```
##base _DOSBase
##bias 30
##public
Open(name,accessMode)(D1/D2)
Close(file)(D1)
Read(file,buffer,length)(D1/D2/D3)
Write(file,buffer,length)(D1/D2/D3)
Input()
Output()
Seek(file,position,offset)(D1/D2/D3)
DeleteFile(name)(D1)
Rename(oldName,newName)(D1/D2)
Lock(name,type)(D1/D2)
UnLock(lock)(D1)
DupLock(lock)(D1)
Examine(lock,fileInfoBlock)(D1/D2)
ExNext(lock,fileInfoBlock)(D1/D2)
Info(lock,parameterBlock)(D1/D2)
CreateDir(name)(D1)
CurrentDir(lock)(D1)
IoErr()
CreateProc(name,pri,segList,stackSize)(D1/D2/D3/D4)
Exit(returnCode)(D1)
LoadSeg(fileName)(D1)
UnLoadSeg(segment)(D1)
##private
GetPacket(wait)(D1)
QueuePacket(packet)(D1)
##public
DeviceProc(name)(D1)
SetComment(name,comment)(D1/D2)
SetProtection(name,mask)(D1/D2)
DateStamp(date)(D1)
Delay(timeout)(D1)
WaitForChar(file,timeout)(D1/D2)
ParentDir(lock)(D1)
IsInteractive(file)(D1)
Execute(string,file,file)(D1/D2/D3)
##end
```

Graphics_Lib.fd

```
##base _GfxBase
##bias 30
##public
*—— Text routines
BltBitMap(srcBitMap,srcX,srcY,destBitMap,destX,destY,sizeX,sizeY,
 minterm,mask,tempA)(A0,D0/D1,A1,D2/D3/D4/D5/D6/D7/A2)
BltTemplate(source,srcX,srcMod,destRastPort,destX,destY,sizeX,sizeY)
 (A0,D0/D1/A1,D2/D3/D4/D5)
```

Listing continued on next page.

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```
ClearEOL(rastPort)(A1)
ClearScreen(rastPort)(A1)
TextLength(RastPort,string,count)(A1,A0,D0)
Text(RastPort,string,count)(A1,A0,D0)
SetFont(RastPortID,textFont)(A1,A0)
OpenFont(textAttr)(A0)
CloseFont(textFont)(A1)
AskSoftStyle(rastPort)(A1)
SetSoftStyle(rastPort,style,enable)(A1,D0/D1)
*—— Gels routines ——
##public
AddBob(bob,rastPort)(A0,A1)
AddVSprite(vSprite,rastPort)(A0/A1)
DoCollision(rasPort)(A1)
DrawGList(rastPort,viewPort)(A1,A0)
InitGels(dummyHead,dummyTail,GelsInfo)(A0/A1/A2)
InitMasks(vSprite)(A0)
RemIBob(bob,rastPort,viewPort)(A0/A1/A2)
RemVSprite(vSprite)(A0)
SetCollision(type,routine,gelsInfo)(D0/A0/A1)
SortGList(rastPort)(A1)
AddAnimOb(obj,animationKey,rastPort)(A0/A1/A2)
Animate(animationKey,rastPort)(A0/A1)
GetGBuffers(animationObj,rastPort,doubleBuffer)(A0/A1,D0)
InitGMasks(animationObj)(A0)
##private
GelsFuncE()
GelsFuncF()
*—— Remaining graphics routines ——
##public
LoadRGB4(viewPort,colors,count)(A0/A1,D0)
InitRastPort(rastPort)(A1)
InitVPort(viewPort)(A0)
MrgCop(view)(A1)
MakeVPort(view,viewPort)(A0/A1)
LoadView(view)(A1)
WaitBlit()
SetRast(rastPort,color)(A1,D0)
Move(rastPort,x,y)(A1,D0/D1)
Draw(rastPort,x,y)(A1,D0/D1)
AreaMove(rastPort,x,y)(A1,D0/D1)
AreaDraw(rastPort,x,y)(A1,D0/D1)
AreaEnd(rastPort)(A1)
WaitTOF()
QBlit(blit)(A1)
InitArea(areaInfo,vectorTable,vectorTableSize)(A0/A1,D0)
SetRGB4(viewPort,index,r,g,b)(A0,D0/D1/D2/D3)
QBSBlit(blit)(A1)
BltClear(memory,size,flags)(A1,D0/D1)
RectFill(rastPort,xl,yl,xu,yu)(A1,D0/D1/D2/D3)
BltPattern(rastPort,ras,xl,yl,maxX,maxY,fillBytes)(a1,a0,D0/D1/D2/D3/D4)
ReadPixel(rastPort,x,y)(A1,D0/D1)
WritePixel(rastPort,x,y)(A1,D0/D1)
Flood(rastPort,mode,x,y)(A1,D2,D0/D1)
PolyDraw(rastPort,count,polyTable)(A1,D0,A0)
SetAPen(rastPort,pen)(A1,D0)
SetBPen(rastPort,pen)(A1,D0)
SetDrMd(rastPort,drawMode)(A1,D0)
InitView(view)(A1)
CBump(copperList)(A1)
CMove(copperList,destination,data)(A1,D0/D1)
CWait(copperList,x,y)(A1,D0/D1)
VBeamPos()
InitBitMap(bitMap,depth,width,height)(A0,D0/D1/D2)
ScrollRaster(rastPort,dX,dY,minx,miny,maxx,maxy)(A1,D0/D1/D2/D3/D4/D5)
WaitBOVP(viewport)(a0)
GetSprite(simplesprite,num)(a0,d0)
FreeSprite(num)(d0)
ChangeSprite(vp,simplesprite,data)(a0/a1/a2)
MoveSprite(viewport,simplesprite,x,y)(a0/a1,d0/d1)
```

Listing continued on next page.

significantly to your ability to format text output.

Another useful feature is to be able to pass commands to AmigaDOS as if you were in the CLI. This is demonstrated in Listing 2.

This involves the use of the DOS library command EXECUTE, which allows you to send commands to the CLI from within Basic, just as if you had typed them. It is only usable if you loaded Amiga Basic from the CLI, not from Workbench. And while not all DOS commands will work by this method, it is a useful execise in programming libraries.

We begin by using the DECLARE FUNCTION EXECUTE & LIBRARY statement to indicate that we will be returning a long integer value from the library routine Execute. Then there are a couple of variables initialized, and you are asked for the CLI command you wish to send. Next, you are asked if you need any data returned from this CLI call. If so, a separate routine is used to call that CLI command. What type of command returns data to you? Many of them, like DIR, LIST, TYPE, INFO, DATE, etc., will list to the screen some information. However, when you send them from Basic, the data is not listed to the Basic window. Instead, it is still directed to the AmigaDOS CLI window. So, for those routines that return data we use the subprogram CLIReturn. This routine directs the data to a temporary file in the RAM disk, and then opens it for input, just like any text file. It then prints the information it gets to the Basic window and deletes the file when through. If we don't require information back to the screen, we use the subprogram CLIStuff. This will simply execute the command string you send. Some examples for CLIStuff are:

```
TYPE TEXT.DAT TO PRT:
RUN SAY -X SPEECHDATA.TXT
RUN PROGRAMNAME
ED DATAFILE.TXT
```

You can use these to get information from the disk back to your programs, or even to multitask some other program from within your Basic program. Some CLI commands don't respond to this mini-shell subprogram, such as CD (Change Directory). But Amiga Basic has a CHDIR command, so that is not a problem.

Calling Assembly-Language Routines

You can also call assembly (machine) language routines from within Basic using the CALL statement. The method requires you to read the machine language into memory, then CALL the routine using a simple variable that identifies the address in memory where the machine code starts. If your routine requires parameters, they must be passed as short or long integers. If you require single- or double-precision numbers, you will need to use the command VARPTR to pass the numbers' address. If your parameter is a string, then use SADD (the string address function) to pass the address of the string variable. And if you need to pass an array, use VARPTR to indicate the address of the first element of the array.

```
DIM ARRAYVALUE(99,99)
DIM SORTCODE%(255) ' 255 BYTES OF CODE
   FOR SORT ALGORITHM
FOR J = 0 TO 254
  READ SORTCODE%(J) ' READ CODE FROM
      DATA STATEMENTS
NEXT J

FOR K = 0 TO 99
  FOR J = 0 TO 99
    ARRAYVALUE(K,J) = RND*1000 ' ASSIGN
      VALUE TO ARRAY
  NEXT J
NEXT K

CODEADDRESS = VARPTR(SORTCODE%(0))
  ' ADDRESS OF MACHINE CODE
ARRAYADDRESS = VARPTR(ARRAYVALUE(0,0))
  ' ADDRESS OF ARRAY

CALL CODEADDRESS(ARRAYADDRESS) ' CALL
  MACHINE CODE

END

REM DATA FOR MACHINE CODE ROUTINE
DATA XXXXX,XXXXX,XXXXX,XXXXX,XXXXX,
     XXXXX,XXXXX,XXXXX
.
.
.
DATA  XXXXX,XXXXX,XXXXX,XXXXX,XXXXX,
      XXXXX,XXXXX,XXXXX
```

We read the machine code in as elements of an array, and using the statement VARPTR, we CALL the address of the base element of the array. Likewise, we created an array of random numbers and passed the location of the base element of the array to the machine-language sort routine.

As you can see, it is not too difficult for the Basic programmer to use the many specialized routines in the ROM and in disk-based libraries from Amiga Basic. And it is just as easy to use your own machine-language routines from within Amiga Basic programs. Even though the actual physical location in memory of the machine code may change each time you use your program, Amiga Basic contains commands like VARPTR and SADD to find the absolute locations so your program can find and execute the code.

I hope this serves as a good introduction to programming the Amiga ROM and disk-based libraries. It is not possible to cover all the material in one article, or even ten. The sheer amount of commands is staggering. The best way to understand it is to keep on plodding along. After all, as the ancient saying goes, a journey of a thousand miles begins with a single step. And we've got a lot of walking to do!■

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Listing continued from previous page.

```
LockLayerRom(layer)(a5)
UnlockLayerRom(layer)(a5)
SyncSBitMap(l)(a0)
CopySBitMap(l1,l2)(a0/a1)
OwnBlitter()()
DisownBlitter()()
InitTmpRas(tmpras,buff,size)(a0/a1,d0)
AskFont(rastPort,textAttr)(A1,A0)
AddFont(textFont)(A1)
RemFont(textFont)(A1)
AllocRaster(width,height)(D0/D1)
FreeRaster(planeptr,width,height)(A0,D0/D1)
AndRectRegion(rgn,rect)(A0/A1)
OrRectRegion(rgn,rect)(A0/A1)
NewRegion()()
NotRegion(rgn)(A0)
ClearRegion(rgn)(A0)
DisposeRegion(rgn)(A0)
FreeVPortCopLists(viewport)(a0)
FreeCopList(coplist)(a0)
ClipBlit(srcrp,srcX,srcY,destrp,destX,destY,sizeX,sizeY,minterm)
 (A0,D0/D1,A1,D2/D3/D4/D5/D6)
XorRectRegion(rgn,rect)(a0/a1)
FreeCprList(cprlist)(a0)
GetColorMap(entries)(d0)
FreeColorMap(colormap)(a0)
GetRGB4(colormap,entry)(a0,d0)
ScrollVPort(vp)(a0)
UCopperListInit(copperlist,num)(a0,d0)
FreeGBuffers(animationObj,rastPort,doubleBuffer)(A0/A1,D0)
BltBitMapRastPort(srcbm,srcx,srcy,destrp,destX,destY,sizeX,sizeY,minterm)
 (A0,D0/D1,A1,D2/D3/D4/D5/D6)
##end
```

Fundamentals of C

C Concepts

Our C programming tutorial continues with a discussion of the key concepts of the C language.

By William B. Catchings and Mark L. Van Name

In our first installment, we discussed the basic components of a C program and used them to build a sample program, called *wordcount*. Here we will examine several key concepts of C. We then will use these concepts in a sample program that performs simple text analysis, called *analyze_text*.

We make the same two assumptions here as in the first installment: that you have some programming experience, and that you have access to a copy of *The C Programming Language* by Brian W. Kernighan and Dennis M. Ritchie. You can find in it more information on the topics we cover. Also, we assume that you have read Part One of this tutorial, although that is not essential.

Variables

C is a structured programming language that groups statements into *blocks*, and requires all variables to be declared before they can be used. When you are working within a block, you need to know exactly which of these variables you can access, or see. The blocks in which a variable may be seen are referred to as its *scope*.

A variable's scope is determined by where it was declared. Most variables are declared within a block. These variables are visible only to statements within that block. Since a block is a kind of statement, all blocks embedded, or *nested*, at any level within a given block can see any variables declared within that block.

Consider the program fragment shown in Example 1. The statement *i=j;* occurs twice: first, in the block labeled Block Two, and then in Block One. The first occurrence is fine, since it can see both *j* (declared in the same block) and *i* (declared in a higher block—Block One). The second (in Block One) will generate an error, as it can see only *i*. Since *j* is declared in a lower block (Block Two), it is not visible.

```
{                 /* Block One */
  int i;
  {               /* Block Two */
    int j = 0;
    i = j;        /* legal */
  }
  i = j;          /* will cause an error */
}
```

Example 1.

As Example 1 shows, you can declare variables at the beginning of any block, not just at the start of a function. Variables that are declared in a block are called *local* variables, as they are visible only locally (i.e., within the block in which they are declared). You can declare variables with the same name in different blocks. When a statement references such a variable, it uses the one declared closest to it. The closest declaration is the first one you find by looking in the current block, then in the one in which the current block is nested, and so on. In essence, you look up the tree of blocks to find the closest declaration. However, you can see only up; variables in blocks down (nested deeper) are invisible to you.

You can make variables visible to all of the routines in a file by declaring them at the beginning of the file, outside of any block of code. You can also declare variables as *external* to a file. This means that they are declared in another file. You do this by prefacing their declaration with the word *extern* and putting it before any block in the file. For example:

```
extern int globalvar;
```

Listing 1. analyze_text program.

```
#include <stdio.h>     /* needed to define the constant EOF */

main( arg_count, arg_strings )        /* perform simple text analysis */
int arg_count;
char *arg_strings[];
{
   int c;
   int num_chars = 0,          /* auto-initialize all of the counters */
       num_pchars = 0,    /* number of non-white-space characters */
       num_words = 0, num_lines = 0,
       num_sents = 0, in_a_word = 0, /* and start out not in a word */
       option = 0;           /* assume they got the invocation wrong */

   /* there should be 1 command line argument. if not, error & quit */
   if ( arg_count != 2 ) tell_usage();

   while ( ( c = getchar() ) != EOF ) /* read until the end of file */
   {
       num_chars++;         /* this counter includes every character */

       if ( is_space( c ) )
           in_a_word = 0;        /* not in a word, so set flag */
       else
       {
           num_pchars++; /* a non-space, so up the printable counter */

           /* if we weren't in a word, increment the word count and */
           /* set the flag to show that we are now */
           if ( !in_a_word )
           {
               in_a_word = 1;
               num_words++;
           }
       }

      if ( ( c == '.' ) || ( c == '!' ) || ( c == '?' ) )
      /* hit a sentence-ending punctuation mark, so bump that counter */
          num_sents++;

      if ( c == '\n' ) num_lines++; /* hit a newline, got another line */

   }

   /* now, based on the command line request, print out the statistics */

   option = lower( (int) **++arg_strings );   /* get the command option */
                  /* note the **++ construct.  The ++ moves us from */
                  /* arg_strings[0], a pointer to the routine name, */
                  /* to a pointer to the first real command line arg*/
                  /* The first * gets us the pointer and the second */
                  /* gets us what we want, the first char it points to*/

   /* in both cases print out a simple header */
   printf( "\n\tSimple Analysis of input text\n" );
   printf(      "\t-----------------------------\n" );

   switch ( option )
   {
      case 'c': /* do complex case first.  print complex stats and */
                /* fall through to print the rest as well */
                /* use floating point number mask %4.1f */
                /* cast the result of all divisions to be floats */
                printf( "Average number of characters per word:   %4.1f\n",
                              (float) num_pchars / (float) num_words );
                printf( "Number of sentences:   %d\n", num_sents );
                printf( "Average number of words per sentence:   %4.1f\n",
                              (float) num_words / (float) num_sents );
      case 's':  /* give the wordcount stats and quit the switch */
                 printf( "Number of non-white-space characters:   %d\n",
                              num_pchars );
```

Listing continued on next page.

If you do this, there must be a corresponding declaration in another file. For our example, it would be:

int globalvar;

A variable that has its declaration outside of the code of one file and an *extern* declaration for it in every other file of a program is called a *global variable*. It is visible globally, to every statement in every routine in the program.

Example 1 also shows how variables can be initialized as they are declared (often called *auto-initialization*). Just follow the name of the variable you are declaring with an equals sign and the value with which you want it initialized. Then either terminate the statement with a semicolon, or insert a comma and put in another declaration. You should initialize all of your variables before you reference them, either this way or with a normal assignment statement. If you do not, there is no guarantee what value the variable will contain when you first reference it.

Related to the scope of a variable is the duration of time during which you can use it. Local variables exist only while the block in which they were declared is being executed. (They are placed on the program stack and removed from it along with that block.) Also, any auto-initialization associated with a variable is performed every time its declaration block is entered. This is usually what you want. Sometimes, however, you want to use a variable only in one block or routine but don't want it to be initialized every time you enter that block or routine. When this happens, preface the variable's declaration with *static*. For example, the declaration:

static int call_count = 0;

creates a variable *call_count* that is initially zero. You can then change its value and know that the new value will not be lost, as it will not be initialized again every time its block is entered. Any auto-initialization of global variables is done only once as they do not belong to any block.

Addresses and Variable Contents

Now that we know when variables may be used, we will discuss how they may be used. You refer to a variable by its name, such as *var1*. The contents of a variable are stored at some location in memory. Suppose that the contents of *var1* are stored at location 347593 in memory. Then the *address* of *var1* is 347593. C allows you to get the address of a variable by using the ampersand operator (&). The value of *&var1* would be 347593. You declare a variable that is to contain an address (often called a *pointer* to the data at that address) by using the asterisk operator (*). The declaration:

char *char_ptr;

says that the contents of *char_ptr* will contain the address of, or point to, one or more characters. *You* determine exactly how many items to which a pointer refers; C sets no limits. Thus, *char_ptr* can point to anywhere from one character to an entire string of characters.

You can use the ampersand and asterisk operators to manipulate directly the addresses of variables and to affect the values of those variables by using their addresses. Consider the following:

```
int var1, *var_ptr;
var_ptr = &var1;
*var_ptr = 1;
```

var_ptr first is declared to be a pointer and then is set to contain the address of *var1*. In the third line, we encounter another use of the asterisk operator. When not in a declaration, the asterisk means to get the contents stored in the address in the designated pointer (often referred to as *dereferencing* the pointer). Since, in this example, *var_ptr* is the address of an integer, **var_ptr* is the integer value stored at the address in *var_ptr*. Thus, the statement **var_ptr = 1;* sets to one the integer that is pointed to by *var_ptr*. Since *var_ptr* was earlier made to equal the address of *var1*, this statement sets the value of *var1* to one. It is equivalent to *var1 = 1;*.

The ampersand and asterisk operators are complementary. Therefore, **&var1* means the contents of the address of var1, or just *var1*. This example is clearly silly. However, the ability to manipulate addresses simply and directly allows you to work very close to the underlying computer system. This ability makes C a very good language for systems-level programming.

Pointers serve another important function in C: arrays are implemented using them. The array declaration:

```
int foo[ 10 ];
```

declares a pointer *foo* that points to 10 integers. The second element of the array *foo* could be referenced either by the usual *foo*[*1*], or by using the pointer **(foo + 1)*. In the latter, we add one to the address contained in *foo* and then get the contents stored at this computed address. The parentheses are required here because the ampersand operator has a higher priority than the plus operator. (See the sidebar on "C Operator Precedence," p. 60, for more information.)

This example also shows why it is important to declare to what a pointer points. The operation *foo + 1* does not just add one to the address stored in *foo;*—it adds whatever is necessary to point to the next integer after the one pointed to by *foo*. If integers are two bytes long, then this operation actually adds two to *foo*. C automatically determines the amount that should be added to get the desired result.

Functions

Programs in a structured language are composed of one or more procedures, either subroutines or functions. The difference is that a function returns a value while a subroutine does not. All C procedures are functions. C relies very heavily on functions: all I/O and other system support is provided by them. Even the *main* routine of a program is just another function. ►

Listing continued from previous page.

```
                    printf( "Total number of characters:  %d\n", num_chars );
                    printf( "Number of words:  %d\n", num_words );
                    printf( "Number of lines:  %d\n", num_lines );
                    break;
        default:    /* tell the usage and quit */
                        tell_usage();
    }
}   /* end of main routine */


tell_usage()        /* tell the user how to call this and then quit */
{
    printf( "You called analyze_text incorrectly.\n" );
    printf( "Correct usage:  'analyze_text < file_name c'  (or s)\n" );
    exit( 0 );      /* use this C library function to quit the program */
}   /* end of tell_usage */

int is_space( ch )    /* returns true (1) if whitespace, false (0) if not */
    int ch;
{
        /* white space is a blank, a tab, or a newline */
    if ( ( ch == ' ' ) || ( ch == '\t' ) || ( ch == '\n' ) ) return ( 1 );
    else return ( 0 );
}   /* end of is_space */


int lower( ch )       /* returns the incoming char set to lower case */
    int ch;
{
    if ( ( ch >= 'A' ) && ( ch <= 'Z' ) ) return ( ch + 'a' - 'A' );
    else return ( ch );
}   /* end of lower */
```

◀ The basic format of a function declaration is an optional return value type (integer is the default), followed by the function's name, and then its arguments, separated by commas, in parentheses. Unlike other C statements, the function declaration is not terminated by a semicolon. After the function declaration, you must specify the data type of each argument, and then the function's code. Example 2 shows a function, *cpy_str*, that copies one string to another, up to a specified maximum number of characters, and then returns the actual number of characters copied.

```
int cpy_str( source, dest, max_char, status )

char *source, *dest;
int max_char, *status;
{
  int i;

    for ( i=0; i < max_char; i+ + )
      if ( ( *dest+ +  =  *source+ + ) != '\0') break;

    *status = 0;
    return( i );
}
```

Example 2.

A C function has three main parts: its arguments, its code and the value it will return.

Let's look first at the arguments. C passes arguments by *value*. This means that it gives a function a copy of the value of the argument specified by the caller. Thus, a change to the argument affects only its value, not the value of the variable put in the call to the function. In Example 2, if *cpy_str* changed the value of *max_char*, it would not change the value of the variable that the caller specified as the third argument. If you need to change the value of some variable of the function's caller, you must pass the address of that variable to the function. The address is then copied, but you can use it in conjunction with the asterisk operator to change the caller's variable. This is how *status* is changed in Example 2. The call to *cpy_str* would resemble the following:

```
len = str_cpy( str1, str2, 50, &status );
```

We use the ampersand so that *cpy_str* is passed the address of *status* rather than the value in it. Similarly, in *cpy_str* we need the asterisk in front of *status* to change its contents rather than the value that is the address.

A function's code follows the rules we have discussed so far. In Example 2, we encounter a slightly more complex statement composed of several of the constructs we have discussed:

```
*dest+ +  =  *source+ +;
```

Here * is applied to *source* to get the contents of the character to which it is currently pointing. Then * is applied to *dest* as it receives the value we just got from *source*. Then the + + operator is applied to both pointers, and they are incremented to point to the next character in their respective arrays.

All C statements evaluate to some value. The value of this statement is the character assigned to the address currently pointed to by *dest*. In the *if* statement, we then compare this value to the special C null, end-of-string value (*\0*). If it matches, we want to stop copying the source to the destination as we have finished. We do so by terminating the *for* loop with a new statement: *break*.

C Operator Precedence

The order in which operations in an expression are executed is determined by the *precedence*, or priority, of the operators involved. One simple type of operator precedence is found in arithmetic expressions: multiplication and division are performed before addition and subtraction. Thus, the expression 4 + 5 * 6 yields 34, not 54. To change such an ordering, we would have to use parentheses.

If two operators are of equal precedence, then we need to know whether they are evaluated from left to right or vice versa. If in the above example addition and multiplication had equal precedence, left to right evaluation would yield 54, while right to left would give us 34.

C provides a very large number of expression operators. In the table below, the operators are ordered from highest to lowest precedence. Those with equal precedence are shown in the same group. Having this table handy while you program can save you a lot of trouble and debugging later.

Operator	**Evaluated**
primary-expression () [] . - >	left to right
unary * & - ! ~ + + - - sizeof (cast)	right to left
binary	left to right
Multiply/Divide * / %	
Add/Subtract + -	
Shift > > < <	
Inequality < > < = > =	
Equality = = !=	
Arithmetic AND &	
Arithmetic XOR ^	
Arithmetic OR |	
Logical AND &&	
Logical OR ||	
Conditional ?:	
Assignment = + = - = * = / = % = > > = < < = & = ^ = | =	right to left
Multi-statement grouping ,	left to right

A *break* stops the nearest enclosing loop. It does not affect the *if* statement, as that statement is not a loop.

The last part of a function is the value it returns. The type of the data to be returned is specified in the function declaration. The value is returned to the caller by the *return* statement. In Example 2, we return the number of characters actually copied in the integer variable *i*. We had to return it in an integer because the function declaration specified a return type of *int*.

Command Line Arguments

Many programs, such as the AmigaDOS CLI commands, require input parameters that you specify when you run the program. These parameters are often referred to as *command line arguments*. In C, you access such parameters through two standard (but optional) arguments to your program's routine *main*. They are usually named *argc* and *argv*, but you may name them whatever you wish. The following code fragment shows how to refer to command line arguments in your *main* function.

```
main( arg_count, argstrings )
int arg_count;
char *arg_strings[];
```

The first argument, *arg_count*, is the number of command line arguments. C considers the name of the program to be the first argument, so *arg_count* is always at least one. The second argument, *arg_strings*, is an array of character pointers. Each of these pointers refers to a standard C *null-terminated* (ends with *0*) character string. The first string, *arg_strings*[*0*], is the program name. *arg_strings*[*1*] is the first argument given to your program. The C runtime library takes the command line the user enters, breaks it into words and puts those words in these character strings. It considers a word to be a group of characters terminated by a space. If we invoked a program *test* with the command:

```
test arg1 arg2 arg3
```

arg_strings[*0*] would contain the string "test\0", *arg_strings*[2] would contain the string "arg2\0", and *arg_count* would be 4. Our sample text analysis program uses command line arguments.

The *switch* Statement

Our sample program also uses a C statement called the *switch* statement. A *switch* statement is equivalent to a series of *if*. . . *then*. . . *else* statements but looks much cleaner. Also, under certain circumstances, some compilers generate much faster code for a *switch* statement than for a group of *if*. . . *then*. . . *else* statements.

The format is the keyword *switch* followed by an expression in parentheses. This expression is evaluated to determine which of the choices within the *switch* statement to execute. Then there is a { followed by those choices. Each choice is indicated by the keyword *case*, followed by a constant integer expression and a colon. After the colon, you place the statements you want to execute if the *switch* expression evaluates to the ►

same value as this *case*'s constant integer expression. You may place here zero or more statements to be executed. Unlike in the body of a function, you do not need to surround such a group of statements with braces, although you may wish to do so to declare a variable local to that group of statements. A } terminates the *switch* statement.

There is one special *switch* option. You can specify what to do if none of the *case* constants equals the value of the *switch* expression. You do this by using the keyword *default*, followed by a colon and a group of statements to be executed.

Once the *case* has been found whose value equals the *switch* expression, all statements following it are executed until a *break* statement is encountered. (A *break* terminates execution of the *switch* statement as well as loop statements.) This allows you to have a number of cases *fall through* and execute the same code.

Casting

C offers several different data types, and they are stored very differently. The most commonly used ones are characters, integers and pointers. Though it varies from one type of computer to another, these three data types are typically 8, 16 and 32 bits long, respectively. They cannot be used interchangeably. Yet, one of C's best (and worst) points is that it provides you a great deal of flexibility in dealing with data. If, for example, you want to use a character as an address, you can.

To bring some order out of this chaos, you use *casting*. You use casting to assure that things of different data types are compared and assigned correctly. You cast a constant or variable by preceding it by a data type in parentheses. If you do not specifically cast a variable reference, C will decide on a data type for you and implicitly cast the reference. However, it will not always decide correctly. If, for instance, you wanted to check to see if a pointer passed to your function was set to zero, you might use the statement:

```
if ( char_ptr = = 0 ) return;
```

You specified no casting, so C chooses the default, which is to cast *char_ptr* to an integer. If integers are 16 bits and pointers 32 bits, as is often the case, *char_ptr* would have 16 bits of its value thrown away and then be compared to *0*. This is bad, as you lose much of *char_ptr*'s meaning. In the following version of this statement, we cast the zero to be a character pointer like *char_ptr*:

```
if ( char_ptr = = (char *) 0 ) return;
```

Now the zero will be extended to 32 bits and the comparison will work correctly.

A problem related to casting is that of declaring what functions in other files will return. By default, C assumes that all functions return integers. If you call a routine that is defined in another file, to get anything other than an integer returned from it, you must declare it in your file. To declare such a function, give the data type it returns, followed by the function name and then empty parentheses. If the routine *foo* returns a pointer to a character string, you should have this statement in your program:

```
char * foo();
```

You should cast rather than trust the compiler to make the correct choice for you. Casting has been largely overlooked in the past, partly because much of the use of C has been on machines where, due to vagaries of the operating system or underlying hardware, C happened to work fine without it. However, when C programs written on such machines were ported without casting to other computers, the programs often did not work. Ports to microcomputers in particular were likely to leave broken programs. If you ever plan to use your program on another kind of computer, casting is a necessity.

We have now covered most of the major concepts and constructs of C. Though not actually a part of the C language, there still remain the C libraries. In Part Three, we will look at the relatively standard parts of these libraries. In Part Four we will discuss the Amiga libraries that let you harness many of your Amiga's exciting features. Until then, we urge you to try our sample program and others of your own devising.■

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Art Behind Glass: Aegis Images and Aegis Animator

Reviewed by Vinoy Laughner

Aegis Development is a company that has made a solid commitment to the Amiga, and one that obviously clearly foresaw the potential of this machine, especially in the area of graphics. Many would agree, after all, that graphics is the Amiga's *raison d'être*. Aegis's first three products are Aegis Images, Aegis Animator (which includes Images) and Aegis Draw (a CAD package); by the time you read this, Aegis Impact, a business-presentation graphics program, will be available also. The major competition in this area comes from, of course, Electronic Arts, with their programs DeluxePaint and DeluxeVideo. How Aegis Images compares with DeluxePaint will figure much in this review; unfortunately, at the time of this writing, I hadn't seen a finished version of DeluxeVideo, so I couldn't make any fair comparisons between it and Aegis Animator.

Painting with Light: Aegis Images

Images is Aegis's paint program and is available alone ($79.95), or comes as part of the package with the Animator ($139.95). (Animator may not be purchased separately, except with a special form that comes in the Images box, plus $60 and proof of purchase.) As I said above, it is worthwhile to compare Images with DeluxePaint from Electronic Arts since both these programs are full-featured powerful paint programs. I have heard that over 50% of Amiga buyers buy DeluxePaint—as many as 70%. Those are pretty enviable statistics. Graphicraft from Commodore, though sophisticated and of high quality, lacks many of the features that make these other two programs so appealing. Graphicraft's only major advantage is its price, $50, but you miss a lot to save $30 to $50.

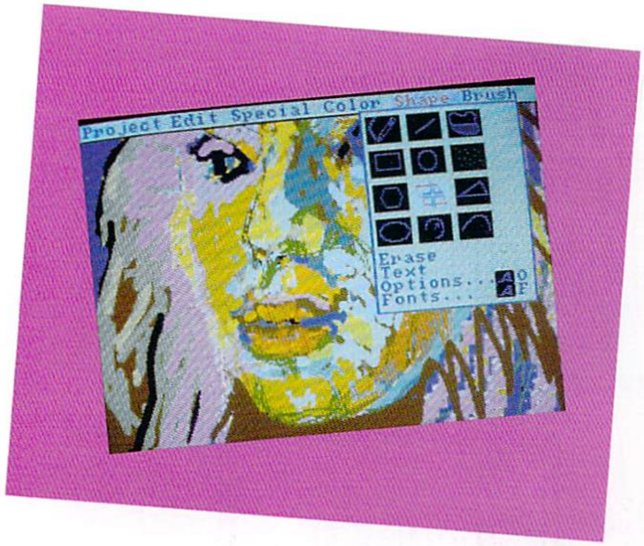
Basic Drawing Tools

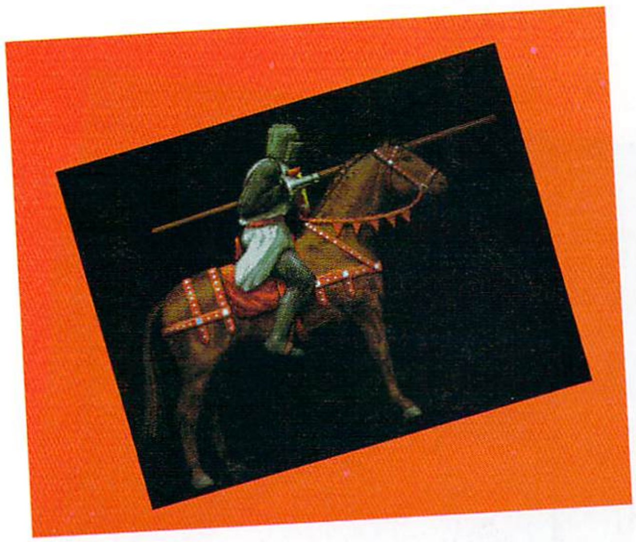
As far as basic drawing tools go, all three available programs are about the same. Images offers 32 colors modifiable from a possible 4,096, allows swapping between two screens and has an airbrush feature (Images and DeluxePaint only), and has large Brush and Shape selection menus. Images offers a few shape options missing from DeluxePaint: a parallelogram and a circular curve. As far as creating custom brushes is concerned, in my opinion DeluxePaint has the better approach, allowing enlarging, reducing or reversing of any size screen area as a brush, with a few easy keyboard entries. Images allows you to define a screen area as a brush also, with its Frame feature, but this brush cannot be as easily manipulated (for instance with color cycling) as in DeluxePaint, and is limited in size. In my opinion, DeluxePaint's most outstanding feature is its custom brush feature. However, though DeluxePaint's brush feature outshines Images', Images is not lacking in powerful and unique special features of its own.

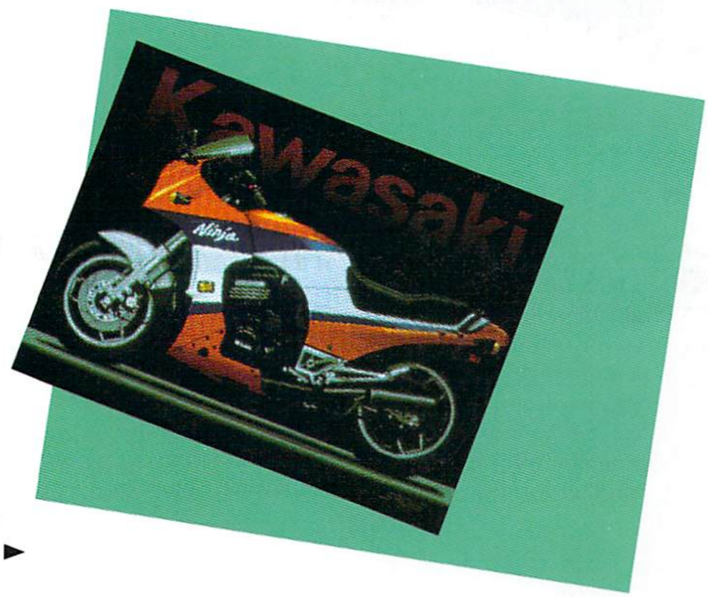
Editing

Beyond the standard Undo, Clear Screen and Swap Screen options, Images allows you to define any area of the screen as a Frame, for use as a brush, or, when saved as a *Window*, to be copied anywhere else—in another Images picture, or, more notably, into an animation in the Animator. Unfortunately, a brush created in this way cannot take advantage of the program's Special features: You can't, for example, create a huge face as a brush and cycle draw with it. However, this feature is still powerful, allowing detailed objects to be repeated, manipulated or animated. Images' Magnification feature allows you to size your magnification window and move it about the screen, a handier approach than that taken by DeluxePaint. Images also allows zooming in by sliding a bar on the side of the magnify window with the pointer.

It is appropriate to mention here that Images uses the menus and options in a way seemingly more native





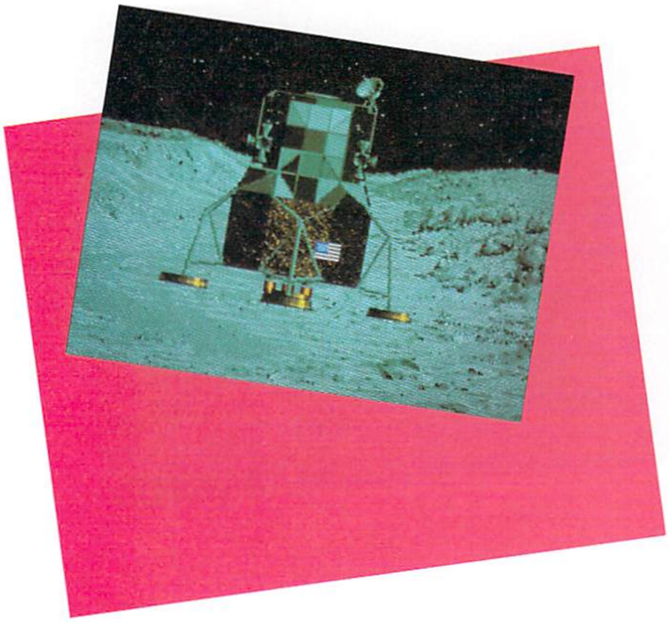


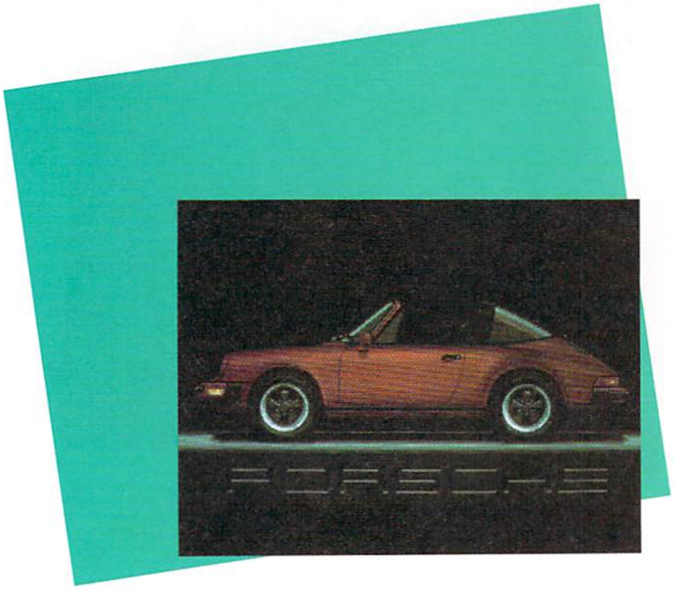
to the Amiga and Workbench than DeluxePaint does—it is more exclusively mouse-oriented. Furthermore, although the menu bar may be hidden from view, it is still immediately accessible, and passes of a brush over the visible menu bar cause it to be painted behind. With DeluxePaint, the option bars when viewable (by function key setting) are not "canvas" space. Constant jumping from mouse or graphics tablet to the keyboard and back again is something that DeluxePaint requires, and something I don't care for. I lean towards a graphics program that requires keyboard entry *only* for text. Images' Workbench "feel" may or may not be of any value to you, but I find its overall approach more comfortable and easier to use, more (gulp) intuitive, if you will.

Special Features

Images has Wash and Smear features, similar to DeluxePaint's Blend and Smear. Wash gives the look of the mingled blurred edge created by watercolors when they meet; Smear gives the general look of oil colors when smeared in a sketchy manner. (I'm not taken by Smear in either program since often one color dominates completely and merely cancels out the other.) Images' Mirror feature (as DeluxePaint's) allows you to divide the screen in different ways into areas that duplicate symmetrically what is drawn in one area.

Images has a four-channel color cycling feature and cycle draw (as does DeluxePaint). A quirk in Images color cycling that I noticed is that after selecting color cycling, you must go to the Shapes menu and select something other than freehand draw or line if you want the cycling to be nice and smooth. Color cycling is a major feature of any Amiga paint program, and Images takes full advantage of it. This is an impressive feature you will spend a lot of time with. I must admit that I find Graphicraft's Cycle feature more than adequate and the easiest to work with; though it has only a





one-channel system, it allows you to produce effects equally as entertaining.

Images other Special Effects features are: Spread, which fills an area with a preset range of colors, gradually blending (dithering) as it fills—this is a useful and clever feature; Antialias, a handy feature that produces a mid-range outline around objects or lines, allowing you to disquise, among other things, the stairstep effect created by a diagonal line; Pantograph, a feature whereby you can reproduce one area of your screen in another location, and visible only when you paint in that location; Grid, its horizontal and vertical spacing which you can define, and which automatically conforms shapes drawn to its grid intersections; Constrain, which constrains lines drawn to its selected degrees; Under, which allows you to paint over without altering a color or a certain preset range of colors, again, very useful; and Tile, a feature that lets you select a rectangular area of the screen as a "tile"; the tile being revealed when you draw or fill, as if it resides behind your current screen. This feature can be used for creating patterns larger than those available with the Patterns feature.

Colors and Patterns

In Images, colors can be selected from the color selection menu or picked from the screen. Images has low- and medium-resolution modes, offering 32 and 16 colors, respectively. DeluxePaint also offers high resolution (eight colors), but unless you have an expensive high-persistence monitor, high-resolution flicker caused by interlacing will be a big disappointment.

One very powerful feature in Images that DeluxePaint does not offer is its Patterns feature. Sixteen patterns are available at any time for drawing or filling and an editor lets you modify any or all patterns. Pattern fills are done by hardware and are lightning fast. Shapes can be set to fill with patterns automatically also. (The circular shapes do not hardware fill.) I have managed to lock the Amiga up a few times with Images doing fills in areas involving complex patterns, or involving intricate line grids; if this happens to you, sit tight, your Amiga will regain consciousness before long; advice: *save* pictures often with any graphics program, so you never lose your efforts. All sorts of amazingly complex textures and fabric-like or patchwork-like effects can be produced with Images' Pattern feature. It is one of Images strong points and is a lot of fun to use.

Shapes

The Shapes menu includes 12 options, including an ellipse, a parallelogram, a circular curve and text from five fonts. An Options selection allows you to choose from outlined or automatically filled shapes, how you want the shapes defined (from end or center points, etc.) and shapes that repeat from your determined points. You can choose to Lock the shape options also so you don't have to go back and configure each shape as you use it.

Finishing Touches

If money is no object and you are going to use your Amiga primarily for graphics, I would recommend owning Images and DeluxePaint. DeluxePaint's custom brush feature is so exceptionally useful, and if graphics is your primary use, you will want to own it too. If it's an either/or situation, however, you wouldn't be foolish in choosing Images over DeluxePaint. Images lacks a few nice features DeluxePaint offers, but has numerous unique special features of its own. I also think it is more comfortable to use, rarely requiring keyboard input. It's also $20 less than DeluxePaint and is not copy-protected. As a stand-alone package, Images is a good value and I can safely recommend it; as a part of the Animator package, it is a must-have for those of you who want to explore the graphics potential of your

Amigas. And Images and the Animator go together like a hand and a glove (er...brush), which brings us to part two of this review.

Moving Pictures: The Animator



Aegis Animator is a metamorphic animation program; with it you can create objects and change their shapes or sizes in defined discrete steps. These objects can also be moved about the screen as you wish and their 32 color possibilities can be modified from the well-worn 4,096. If making moving images or cartoons has ever intrigued you, this program will give you the ability to do so.

The Whole Show

The Animator allows you to create up to nine separate animated sequences concurrently and display them on its Storyboard. These nine sequences (actually each made up of numerous sequences themselves) can also be combined in various ways and spliced together to create your own "epic" animations. Animator *scripts* are broken up into discrete time segments called *tweens*. Within any given tween, numerous objects can be manipulated, separately or together. Eventually the connected tweens make up the final complete animation, the above-mentioned script.

The timing of an animation can be controlled with the Time feature. Individual tweens can have their times adjusted to add more natural motion to the movement of an object in a script, for example. Objects can change colors in the context of an animation, all under your planning and control.

You can create either lines or polygons in the Animator, and it has the set shapes Circle, Block and Star to choose from. Shapes can be chosen as outlined only or as filled. Once you have chosen the shapes you want, combinations of which can be made to create more complex objects, you can control their movement in different ways. Objects can be eliminated at any time in the context of the script with the Destroy feature and objects can be duplicated easily using the Clone feature. So if you came up with a particularly nice looking fish-shaped polygon for a deep-sea animation, for instance, you could quickly clone a whole school.

Directing the Action

The options you have for moving your "object players" fall into certain categories: sideways, forward and backward movement; apparent 3-dimensional rotation around a vertical or horizontal axis, (the locations of which you determine), or in-plane rotation; size or color changes; a path you can preset for an object to follow; a change from filled to outlined objects (or vice versa); and finally, *metamorphic* change.

The Morph option allows you to subtly or completely change the shape or position of an object in an animation gradually or quickly. You can use the Hook or the Loop to stretch, bend and in general transform any line or polygonal object. You could, as a simple example, have a sequence where stars turn into squares which then turn into random shapes. This amazing feature makes this program fun and very powerful.

Individual polygons can be acted upon as whole objects, or in segments, or by the points that make up the shape. Objects can also be acted upon individually or as groups.

Watching Your Movies

Scripts can be run while in progress either as individual tweens, whole scripts, or in a loop, so a script will play over and over. The Next Tween feature allows you to step through tweens for editing, reviewing and fine tuning. Tweens can be viewed at their beginnings or ends, so you can easily think through the progress of a given tween.

Too much space would be required to exaustively describe every feature of this program. The specifics are not too easy to explain; unless you are familiar with animation jargon, the word *tween* itself is rather obscure. But the new terms and concepts involved in this product are well worth learning, considering the fascinating end results. For all its complexity, it is really amazingly easy to learn and use. Of course, to complete a highy polished and complex animation will take planning, time and effort, but it can be done with the Animator and it is worth the work.

Artistic Collaborators

On the Amiga's silver screen, Images and the Animator were, so to speak, made for each other. Pictures created in Images can be used in the Animator as backdrops, and any objects created with Images can be used in the Animator as "players" in an animation script. You cannot metamorphically alter objects created in Images, but they can be moved around and acted upon in other ways, and you can save these backgrounds and characters in such a way that you can use them over and combine and alter them as you wish. ►

◀ Adding the dimension of video makes the possibilities even greater. Paint program images, video images and Animator-generated images can be combined to make highly professional moving video animations. This not only places these creative visual technologies in the home, but opens up numerous applications for professionals who don't have the big bucks for expensive equipment. We will have a lot more to say about animation and video in the future, and it looks like Aegis will be a major player.

DeluxeVideo, from Electronic Arts, could surely give Animator a run for its money (or yours). What I have seen of DeluxeVideo looks very deluxe indeed; it incorporates, among other things, text, various screen wipes and above all, *sound*. It does, however, involve a totally-different approach to moving images than Aegis Animator (it uses cel animation); Animator stands alone as a very sophisticated and entertaining metamorphic animation program. Therefore, I'm hoping that these products aren't perceived as either/or products. I have learned a lot about computer graphics and animation from using the Animator, and have had hours of fun as well. It will be used in unique and different ways than DeluxeVideo; I am hoping they both do well.

The Last Frame

The Amiga lends itself to stationary and moving graphics; Images addresses the former area, and the Animator is designed to take creative advantage of the latter. The Animator offers graphics possibilities heretofore unavailable except to professionals and at a high cost. Polished animations can be created, combining detailed backgrounds and drawn objects (from Images), polygonal objects that can be altered metamorphically (created in Animator itself) and video, using the Genlock device and a video camera. The Animator points in many different graphics directions the Amiga can go and opens doors to new combinations of different mediums.

Aegis Development has, in my estimation, so far done a great job of creating products that allow serious and entertaining exploration of Amiga graphics, for artistic dabblers and professionals, and at a very reasonable price. Aegis Draw (CAD) could be instrumental in putting Amiga creativity into the hands of architects, and Aegis Impact could make presentation graphics a more affordable luxury for many businesses. I can highly recommend Aegis Animator/Images to anyone interested in their Amiga's graphics potential.■

Aegis Images
Aegis Animator (includes Images)
Aegis Development Inc.
2210 Wilshire Blvd.
Santa Monica, CA 90403
213/306-0735
Images, $79.95; Animator/Images, $139.95
Both programs require 512K

The Amiga Shows Up

By Bob Ryan

COMDEX in Atlanta proves that the Amiga is at the center of innovation and excitement in the micro world.

"I laid out a lot of money for my Amiga and all I wound up with was an expensive doorstop."

Thus wrote one *AmigaWorld* reader earlier this year, reflecting the feelings of many people who had taken a chance on the Amiga and Commodore. Commodore's very low profile at last year's COMDEX/Fall and this January's Consumer Electronics Show did nothing to raise the spirits of Amiga boosters. To top it off, many Commodore and third-party products for the Amiga had missed their earlier, overly-optimistic release dates, adding to the frustration of a user community starved for software and hardware products. Could the harpies be right? Was the Amiga doomed to failure?

These questions and more were on my mind as I walked into the World Congress Center in Atlanta, sight of this year's COMDEX/Spring. Five minutes after elbowing my way into the Commodore booth, I knew the skeptics were wrong. The Amiga is here to stay.

Commodore Strikes Oil

Looking like an off-shore drilling platform, the Commodore booth was 2,400 square feet of excitement and innovation. Dozens of developers were displaying their wares for the Amiga, putting to rest the notion that the Amiga is a machine without software and hardware support. The enthusiasm developers displayed for the machine was infectious, and the Commodore booth quickly became "THE place to be" at COMDEX.

My first foray into the booth brought me to the Mimetics exhibit, where Bob Hoover and Joy Weigle were demonstrating SoundScape. SoundScape is a beautiful software system that allows you to use your Amiga as a professional music studio. Combined with Mimetics' stereo digitizer and MIDI interface, SoundScape gives you control over any number of MIDI devices and allows you to produce some mindbending (and earbending) effects. SoundScape is a must for professional musicians who want to explore and exploit the potentials of electronic music.

Next to Mimetics, Electronic Arts was demonstrating a music program of a different sort. If, like me, you barely managed a D in Music Theory 101, then you'll love Instant Music. The program plays three parts of a four-part piece; you play the fourth part with your mouse. The great thing is that the program keeps you in tune and at the correct rhythm. Watching the demo was fun, but it wasn't long before I pushed my way to the front and began jamming on my own. If only my old music professor had been there to see me.

Across from Instant Music, Activision demonstrated Music Studio. Music Studio lets you compose and play songs, control MIDI devices and create new sounds very easily. While it doesn't have all the professional score-printing features of Deluxe Music Construction Set or the power and versatility of SoundScape, Music Studio is going to be a hit. It is fun, easy to use and it only costs 60 bucks.

By the way, the Video RoomMate Powered Speaker System from Bose that *AmigaWorld* reviewed in March/April '86 were all over the Commodore booth. It seemed that everyone who showed off a sound or music product was using them.

Son of Transformer

Also near the Mimetics display was an Amiga with a curious box hanging off the side. The program running was obviously a flight simulator, although I couldn't understand why the designers had used so few of the Amiga's colors. The reason, of course, was that the program wasn't designed for the Amiga: It was Microsoft's Flight Simulator for the IBM PC.

The box was the Amiga Sidecar. Due out in the Fall (after it gets FCC approval), the Sidecar is a box about one-foot square that lets you run IBM-PC software at full speed on your Amiga. In addition, it contains three expansion slots that can be used by both MS DOS and AmigaDOS. Needless to say, the Sidecar is an impressive piece of hardware. For more details, see the product description on p. 46.

There was a lot of impressive hardware at the show. I had my first glimpse of the Amiga Genlock—the device that lets you overlay graphics images on pictures from

a video source. You can display the result on your monitor and even save it to videotape. Commodore was also showing Amiga Live!, their real-time framegrabber. It transforms images from a video device into digital graphics that can be manipulated like any graphics on the Amiga.

Surprisingly, Commodore is now saying that neither the Genlock nor Amiga Live! will ship before the Fall. Although I was disappointed with the news (both products were to have been released in the Spring), it seems to reflect a new attitude at Commodore: Don't frustrate people by announcing unrealistic release dates.

If you can't wait that long for a digitizer, you can get Digi-View. It isn't a real-time framegrabber, but it does support the 4,096-color, hold-and-modify mode. It also has one other advantage over Amiga Live!: It's available now.

Next to the Digi-View display, Dan Lovy of Applied Visions was demonstrating FutureSound, his sound digitizer for the Amiga. There was always quite a crowd around the Digi-View and FutureSound displays. People are very interested in how the Amiga can capture and manipulate sounds and pictures from the analog world.

The Expanding Amiga

Many companies were displaying hardware expansion devices for the Amiga. The most popular memory-expansion cards were Cardco's 1MB (one megabyte) aMEGA board and Comspec's 2MB A2000 board. Both devices are auto-config, a term you'll be hearing a lot of in the coming months, especially with the release of version 1.2 of Kickstart and Workbench. An auto-config device is one that indicates its existence to the operating system on powerup. You don't have to configure or install (in the software sense of the term) an auto-config device. If you use a device that is not auto-config, you could experience memory conflicts with other devices that are.

To give you an idea of how auto-config will make life easier for all of us, consider the differences between the Cardco and Comspec boards and the Tecmar T-card. With the Cardco and Comspec boards, you simply plug them in and the memory they contain is immediately available to the operating system and to any programs that follow Commodore's guidelines for memory management (something all programs should do). With the T-Card, you have to go through an elaborate installation procedure. I've had the T-Card for weeks now and I still haven't gotten it to work properly. From now on, auto-config will be a must for Amiga expansion devices.

Also on the hardware end, The Micro Forge demonstrated their expansion chassis for the Amiga, as did Byte-by-Byte. The Micro Forge also demonstrated their tape backup for hard-disk drives. The tape backup will make the Amiga more attractive to large and small businesses. *AmigaWorld* will be taking a close look at the issue of hardware expansion in our next issue.

The Big Three

If you think your Amiga can't cut it as a productivity tool, think again. At COMDEX, I saw three database programs for the Amiga, two word processors and three spreadsheets. The database programs ranged from a file manager—MiAmiga File—to Datamat, an extremely powerful, relational database-management system. MiAmiga File reminds me of the database in Appleworks, but it is much easier to use. I have never seen a file-management program that lets you manipulate data as easily.

Datamat is at the opposite end of the spectrum. A true database system, it can access data from many files at one time and it lets you manipulate the data to your heart's content. On the negative side, the version of Datamat shown at COMDEX was a straight port of the program as it exists for MS DOS, VAX and UNIX machines. Transtime Technologies is at work on developing an Intuition-based front end for the program. Datamat has all the power you'll ever need out of a microcomputer database. All it needs is the right user interface to let people take advantage of that power.

Aquisition, a database-management system from Taurus, falls between MiAmiga File and Datamat. Like MiAmiga File, it features an Intuition-based front end. The difference is that Aquisition—a network type database manager—is nearly as powerful as Datamat. Due out in the Fall, Aquisition shows that even "serious software" can be vastly improved by making it easier to use. ►

◀ On the word processing front, Byte-by-Byte showed up with the Write Hand, a simplified word processor (a la PFS:Write) that you can buy as a stand-alone product or as part of the Financial Plus package. I'm no businessman, but Financial Plus seems to have everything you need to run a small business with your Amiga.

The other new word processor I saw was Scribble! from Micro Systems Software. Scribble! is a definite improvement over Textcraft: It eliminates the six icons used in Textcraft. With Scribble!, you select what you want to do from menus. This is a more consistent approach than Textcraft uses and I like it. (One word processor I didn't see was Textcraft Plus. Commodore listed it in their press kit but didn't show it in the booth.)

Micro Systems Software's other products are Online!, BBS-PC, Analyze! and an as yet unnamed database. I got a chance to meet Steve Pagliarulo, who did the coding, and Mark Lautenschlager, who wrote the manuals for all of these products, as well as Larry Studdard, who makes sure that everything gets done. Larry must be doing something right, because I don't see how so few people can produce so many fine products in such a short period of time. Maybe he should write a book.

Look Out Lotus

It was ironic that the Lotus Development booth was next door to the Commodore booth, because I saw three spreadsheets for the Amiga that could make you forget 1-2-3. The first was the above-mentioned Analyze!. Analyze! uses an Intuition-based interface to make the power of a spreadsheet accessible to dummies like me. VIP Professional is a spreadsheet for the Amiga that emulates the workings of Lotus 1-2-3, right down to the macros and 1-2-3's limited graphing capabilities. Thankfully, VIP Professional also has a separate program that lets you create colorful, Amiga-like graphs from your spreadsheet data. Dan Nelson of VIP Technologies thinks that his product will swing a lot of die-hard Lotus users into the Amiga stable. After all, they won't have to learn anything new to produce their "power spreadsheets." The last spreadsheet program I saw was MaxiPlan from Maxisoft. MaxiPlan goes a step beyond Analyze! in taking advantage of the Amiga's special capabilities, such as multitasking, speech and color graphics. (For more about MaxiPlan, see the product highlight on p. 74.) Between MaxiPlan, Analyze!, VIP Professional and Lattice's Unicalc, which has been on the market for months already, Amiga owners can choose the spreadsheet program that best suits their needs.

Beyond the Big Three

Jim and Karen Bayless of New Horizons Software were demonstrating Flow, their outline processor for the Amiga. Jim explained that they had added yet another way to export Flow files to Textcraft. He also demonstrated how Flow could be used as a free-form database. Like many Amiga products, Flow has a lot of hidden power.

Desktop utilities were also in evidence at the show. Digital Creations was showing off Gizmoz, and MaxiSoft had the latest version of MaxiDesk. Mike Lehman of MaxiSoft informed me that the manufacturing problems that had plagued the first release of MaxiDesk had been cleared up in the latest version. Mike also showed me the four components of the MaxiPower series. MaxiKey is a keyboard macro program that lets you enter abbreviations for commonly used words and phrases. MaxiCache sets up a RAM buffer between any program you're running and a floppy disk. The program accesses the buffer rather than the disk, thus saving a lot of access time. The buffer then updates the disk without slowing the operation of the program.

MaxiMizer and MaxiShare are two programs that I found fascinating. MaxiMizer lets you record long sequences of keystrokes and mouse commands from inside any application program. For instance, you can draw a figure in a graphics program, recording the brushstrokes automatically. You can then choose another color or brush size, position the cursor near the beginning of the original drawing and have MaxiMizer reproduce the drawing in the new brush or color. The result is a slightly offset copy of the original. You're not limited to reproducing drawings with MaxiMizer—you can save any combination of keypresses and mouse actions.

MaxiShare is an extension of MaxiMizer. It lets you link two Amigas that are running the same application program and allows them to exchange data interactively. The connection can be direct or via a modem. Using the program, you can draw pictures on your version of Aegis Images or DeluxePaint and replicate your key and brush strokes on your friend's machine located across the country.

Speaking of communications, the aforementioned Digital Creations is also selling Digital Link for the Amiga. I didn't see it demonstrated at the show, but I didn't have to. I've already used it to transfer files from a Mac to my Amiga. It works.

Hardcore

A number of languages and utilities were on display at the show. Lattice and Manx were side by side, exhibiting their C compilers for the Amiga. Lattice will soon be releasing an updated compiler that will have greatly improved floating-point performance. Janice Suckow of Manx reports that they're quite pleased with the reception their C compiler has received from the Amiga development community.

Les Caudle of TDI Software Inc. was exhibiting his Modula-2 compiler for the Amiga. Modula-2 is the direct descendant of Pascal; in fact, it corrects many of the deficiencies of Pascal. I've never tried the language, but from what I heard from Les and others, I'm going to learn Modula-2. C is nice, but the source code is just

about unreadable. You can tell what a Modula-2 program is doing just by reading the source code, and it gives you the same bit-level manipulation that makes C so popular with systems programmers.

In the area of utilities, Metadigm showed their Metascope program for the Amiga. It is an object-code debugger that lets you step through your programs one instruction at a time. Also on display was Printer Driver Maker from Software Supermarket. Not surprisingly, the program lets you create custom printer drivers for the Amiga.

Feasts for the Eyes

Some of the graphics programs being produced for the Amiga are simply stunning. Aegis Development was showing Images and Animator (reviewed elsewhere in this issue), Draw (an amazingly low-priced CAD package) and Impact, a business graphics and presentation program that should be out by the end of the year. Not to be outdone, Electronic Arts showed Deluxe Video Construction Set (previewed in this issue), DeluxePrint (reviewed in this issue) and a number of new entertainment products. These include Marble Madness, Chessmaster 2000 (which has a United States Chess Federation rating of over 2100—nearly master class) and Return to Atlantis, a graphics adventure game that lets you converse with different characters.

DeluxePrint could turn out to be the most popular program EA has released for the Amiga. After seeing it, I can understand why Broderbund has shelved its plans to bring out Print Shop. DeluxePrint is by far the superior program.

Bing Gordon of EA also informed me that the company was bringing out an upgraded version of DeluxePaint this summer and that they would also be selling a DeluxePaint Utility Disk. The disk will have a slide-show program and a lot of pictures and clip art. I was very surprised to see the number of new products that EA is developing. They apparently aren't content to rest on their laurels as the recognized leader in Amiga software development.

Elsewhere in the booth, Mindscape was demonstrating The Halley Project. It looks great on the Amiga (but I can't understand why they didn't draw rings around Saturn). The Scarborough System had Mastertype for the Amiga. As good as this typing tutor is on other machines, it is better on the Amiga. On the more serious (and expensive) side, Soft Circuits was showing PCB CAD—formerly known as PCLO. This program is a professional tool you can use to design and test printed circuit boards. This program will sell a lot of Amigas to electrical engineers.

Finally, Commodore was showing a game called Mind Walker. Developed by Synapse, a division of Broderbund, the program is a marvel of fast animation and music. I didn't understand the game from the demos, but I've never seen a better looking game. Watch for it.

That's about it for COMDEX, the show that reaffirmed my belief that the Amiga is here to stay. I wish every Amiga owner could have attended the show, just to see the excitement of the people who work closest with the machine. No more excuses exist for using your Amiga as a doorstop.■

MaxiPlan Spreadsheet: Unmistakably Amiga

AmigaWorld previews a spreadsheet that brings all the capabilities of the Amiga to bear on the question "What if?"

By Bob Ryan

MaxiPlan, from Maxisoft of Pebble Beach, CA, is one of a small but growing number of programs that are unmistakably Amiga programs. Like MiAmiga File from Soft-Wood and graphics programs such as Aegis Images and Deluxe Paint, MaxiPlan is easily identifiable as an Amiga program simply by the look of its screens. It uses most of the features that make the Amiga unique; it couldn't look the same on any other personal computer.

Like all spreadsheets, MaxiPlan uses a matrix of columns and rows to arrange and analyze data. The power of a spreadsheet lies in the fact that you decide the relationships between the data. You can also change the numbers easily to answer those "what if" questions that spreadsheets handle so well.

Starting Out

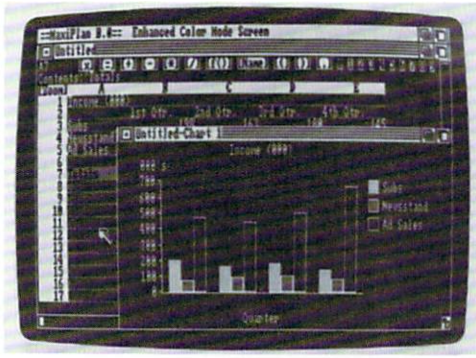
MaxiPlan works under Workbench; the first window that comes up is the Control window. From here you indicate whether you want four or eight colors for your worksheet (the default is eight), and whether you want to open an existing worksheet or create a new one. Deciding how many colors to use in a worksheet is important. Eight-color worksheets and charts are striking, but use more memory than four-color ones. You may have to stick with four colors when you create a large worksheet.

Selecting New Worksheet from the Control window brings up the basic worksheet window. With MaxiPlan, you can have six windows active at once. Most of the screen is taken up with the worksheet—the familiar arrangement of numbered rows and lettered columns that make up all spreadsheet displays. Above the worksheet, the program displays the coordinates and contents of the current cell and a string of "function buttons" that allow you to enter formulas into cells by using the mouse alone. At the sides and bottom of the worksheet are vertical and horizontal scroll bars and a sizing gadget. Except for the eight colors and the function buttons, MaxiPlan seems like any other spreadsheet.

MaxiPlan is not copy protected. Furthermore, MaxiSoft decided in June to drop copy protection of all its products.

King-sized Sheets

MaxiPlan's strengths become apparent when you begin to fill the worksheet with formulas and data. First of all, MaxiPlan can create huge worksheets—up to 8 million cells, depending upon memory—so you have to have an easy way to move around inside a worksheet. MaxiPlan gives you a lot of ways to specify a particular cell as the active cell. You can use the cursor keys or WordStar-type control-key combinations; you can click on a cell with the mouse; you can use the vertical and horizontal scroll bars. Using the command menu, you can move to the top-left or bottom-right of the worksheet, specify a particular cell's coordinates or specify the name of a cell. Finally, MaxiPlan has a zoom feature: By clicking in the zoom box, all columns are reduced to the width of their identifying letter(s), allowing you to get more of the worksheet on the screen for quick cell selection with the mouse. When you're where you want to be, clicking zoom again returns the columns to normal.



The zoom feature is nice, but what makes MaxiPlan unique is its use of color, text styles, speech and multitasking. One of the 63 built-in functions lets you designate the color for a cell or a range of cells. Another lets you designate the style of the display of a cell's contents. The styles are normal (default), bold, underline, italic and any combination of the four.

The best thing about having color and style control as functions is that you can control the display characteristics of a cell depending on the contents of a cell. For example, if the contents of a cell goes above a predetermined limit, you can have the contents displayed in boldface. Conversely, you can have negative numbers displayed in red (or blue, or whatever). With the ability to highlight important cells, you can create a worksheet that is self-documenting.

Say It Again, Plan

MaxiPlan gives you two ways to access the Amiga's speech-synthesis capability. The first is via the Say function, which allows you to have your Amiga speak a message based upon your criterion. The second use of speech comes with the cell notes.

Each cell in a MaxiPlan worksheet can have a cell note consisting of up to five lines of text. When a cell is selected as the active cell, hitting the help key activates the cell note. Cell notes can either be printed on the screen, spoken or both. With them, you can have on-line help that is specific to your worksheet. Think of it: You can create a spreadsheet template that highlights the input cells with a specific color. Then, you can provide the cells with cell notes that explain what should go into the cell. The result is a template with such easy data entry that anyone can use it with a minimum of fuss.

Six Pack

By taking advantage of the Amiga's multitasking capability, MaxiPlan lets you open up to six windows at a time. The windows can be any combination of worksheet and chart windows as long as one of the windows is a worksheet. Creating charts with MaxiPlan is a breeze. You can use MaxiPlan's defaults for creating charts or you can specify which columns and rows to graph. You can create bar, line, area and pie charts. You can have more than one chart linked to the same worksheet. The best thing about the MaxiPlan charts is that they are dynamically linked to a worksheet; make a change in the worksheet, and the chart automatically changes. The charts also automatically size themselves to fill the available window space.

MaxiPlan also lets you cut and paste between worksheets. The program automatically opens a clipboard when you cut or copy from a worksheet. After clicking in the window of another worksheet, you can easily paste the information from the first window into the second.

Leftovers

Like Lotus 1-2-3 and many other "mega-spreadsheets," MaxiPlan has some built-in database functions. You set aside a certain number of cells for the database and you can use specific functions and commands to manipulate text data within the database range. You can insert and delete records, sort records and select records based upon a specific criteria. You can also load and save database areas from within worksheets. The functions available for manipulating the database include sum, average, variance and standard deviation. The MaxiPlan database is a nice bonus in an already powerful program.

Other important features of MaxiPlan include the ability to import files created with Lotus 1-2-3, the ability to protect cells and ranges of cells and the fact that charts are saved in IFF graphics format, allowing you to spruce them up further with DeluxePaint or Images. The most important fact about MaxiPlan, though, is that it takes full advantage of the hardware. There are a number of fine spreasheets available for the Amiga—Analyze! and VIP Professional would be superior programs on any machine—but if you want a spreadsheet program that captures the capabilities of your Amiga, then check out MaxiPlan from MaxiSoft.■

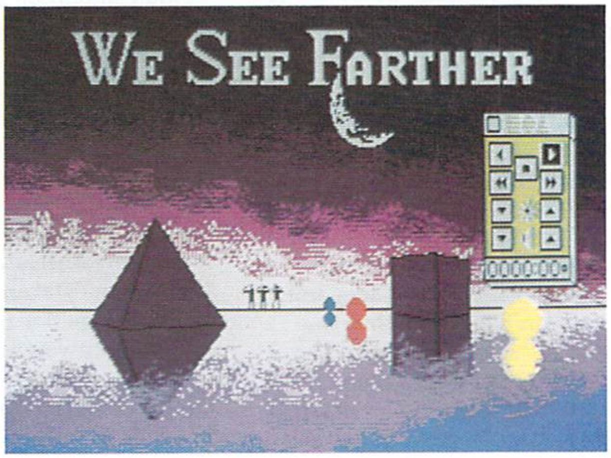
Please note: This is not a review, but a preview based upon the writer's first impressions of the pre-release product.

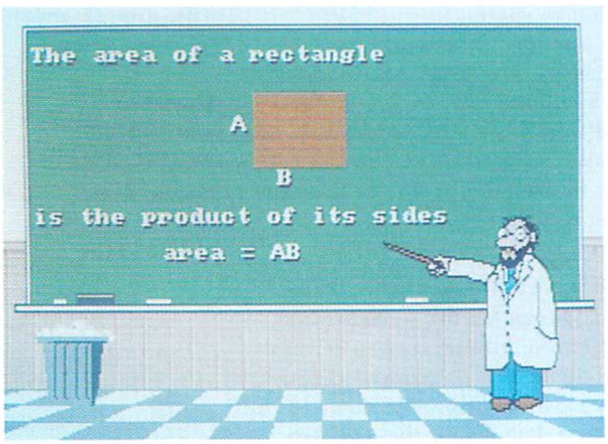
MaxiPlan
MaxiSoft
2817 Sloat Road
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DeluxeVideo Construction Set

A tool for professionals and video enthusiasts alike, DeluxeVideo Construction Set gives you the power to create and enhance animated videos with your Amiga.

By Bob Ryan





DeluxeVideo Construction Set is difficult to categorize, simply because there has never been a program quite like it. Aegis Animator for the Amiga and Fantavision for the Apple II are similar in some respects, but their strength lies in polygon tweening. DeluxeVideo, written by Mike Posehn and Tom Casey, lets you combine and manipulate pictures, animated objects, music, digitized sound, text and regular polygons into video sequences that you can show on your monitor or dump to videotape. In effect, DeluxeVideo Construction Set is an easy-to-use animation programming language for your Amiga.

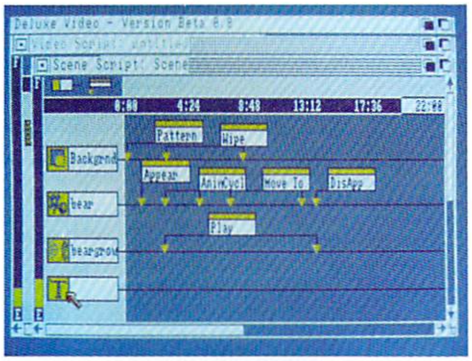
Big Production

DeluxeVideo is a large program: It occupies three Amiga disks. The Maker disk contains the tools you need to make videos. The Player disk contains the program that runs the videos you create with Maker and a number of demonstration videos. The third disk contains parts (pictures, sounds, etc.) that you can use in your videos, an Unpack utility that breaks videos down into their component parts, and Framer, a utility that lets you extract animation objects from IFF picture files.

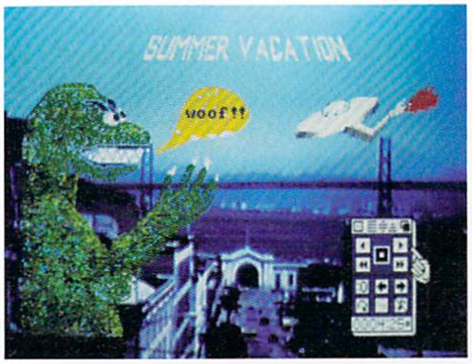
Of the three disks, only Maker is copy protected. It uses a key-disk copy protection method—you can copy the program to any disk, but you have to insert the *original* Maker disk at some point in the boot process to run the program. Although the Maker program can also play back videos, Electronic Arts included the Player program on a separate disk so that you can make videos and then distribute them to friends and associates.

Video Construction

To make a video, you select the DVideo icon from the Maker disk and New from the subsequent project menu. DVideo now displays the Video Script window.







A video constructed with DeluxeVideo consists of a number of tracks and effects, arranged in a hierarchical structure. The top level of the hierarchy is the Video Script. At this level, you can have a minimum of one track and a maximum of five. The one track you need in every Video Script is the Video Track. The other tracks available at the Video Script level are Foreground, Background, Music and Control.

Tracks at the Video Script level have global effects. Any songs you indicate on the Music track will play for whatever duration you indicate. The music may be superceded by a sound effect in some scene, but it will pick up again after the sound effect is over. The Video Script level sets the environment for your video.

Heart and Soul, Track and Effect

Video Script tracks are composed of effects. The Video track, for instance, consists of a number of effects strung together that, in their entirety, form the heart of your video. Just like in the movies, effects on the Video Track are called scenes. To create an effect (scene) on the Video Track, you pull down the empty effect box from the corner of the Video Script window and place it on the track. Clicking on the empty effect box brings up a Scene Script.

Scene Scripts are where most things get done in DeluxeVideo. Like Video Scripts, Scene Scripts have two components, a track and an effect. At this level however, putting an empty effect on a track doesn't create a new scene; rather, you get a requester box that lets you indicate the effect you want in the scene.

For example, let's say you want to load a picture into memory and then have it appear on the screen. At the Video Script level, you click on the empty effect box on the Video track (the default track) to get to the Scene Script level. At the Scene Script level, you move an empty track box onto the track display. At this point, a requester pops up, asking you to indicate what type of track you're creating. You click on the Picture box to indicate a picture track, and DeluxeVideo goes to the data disk and gives you a list of all the pictures on the disk. You then choose the one you want to work with.

The Picture track now takes the name of the picture you've indicated. If the picture was named "Still Life" on the disk, the Picture track would now be labeled "Still Life". While you've indicated the picture you want, you still haven't told the program what you want to do with it. This points out the way that DeluxeVideo works. Tracks are *nouns*—things that are acted upon. Effects are *verbs*—they act upon the tracks.

Action!

You can perform five different effects on a picture: Wipe, Load, FadeIn, FadeOut and Cut. You're first step should be to Load the picture. The Load requester has three options: Cut, Get Ready and Cancel. Cancel is self-explanatory. Cut tells Player to display the picture as soon as it is loaded. Get Ready keeps the picture out of sight until you choose another effect like Wipe or FadeIn.

By choosing Cut, the picture is displayed as soon as it finishes loading. You've just written your first video.

Beads on a String

Not impressed, huh? It's just taken you five minutes to do what any paint program can do in five seconds—display a picture. If that's all DeluxeVideo can do, it's nothing special. But rest assured, the best is yet to come.

DeluxeVideo's power lies in its ability to create multiple tracks with multiple scenes and effects on each track. You string scenes and effects together like beads on a string, controlling the timing of each, having some ►

◄ play simultaneously while others occur in sequence, until you've created video animations of astounding complexity. And no matter how complex the video, the basic building blocks remain the same—tracks and effects.

DeluxeVideo has the power to do many things. It can take a brush from DeluxePaint or a window from Aegis Images and move the object against a picture background. It can resize the object as it moves, and even animate all or part of the object. Animation is accomplished with the help of a painting program and the DeluxeVideo Framer utility. Using the painting program, you can, for example, create a specific number—up to 99—of rectangles, each being a slightly different version of the same object. The rectangles must all be of the same size, so you'll have to use a grid.

Once you've created the picture with the animation object, you run Framer and capture all the different versions of the object. Then, when you choose AnimSeqn from the Object requester, DeluxeVideo lets you indicate the sequence of the animation. Although it sounds complicated, animation is a simple process with DeluxeVideo. The hardest part is creating the slightly altered versions of the same object with a painting program. DeluxeVideo takes care of the rest.

Deluxe Video also lets you include text in your videos and move it around as an object. If you want to get fancy, you can go to the Polygon Text option, where you can also size and rotate text. Polygon Text is slower that regular text, but you can do more things with it. In addition to manipulating alphanumeric text, you can also use any of the 26 built-in regular polygons (arrows, boxes, etc).

What Time Is It?

DeluxeVideo lets you easily synchronize events. Each effect box has one or two "timing legs" that let you indicate when an effect should begin and end. (Effects with one leg have a set duration that you can't control, like loading a picture from disk.) To synchronize two effects on two different tracks, you simply line up the starting points of the two effects. For instance, if you wanted the appearance of a foreground object to coincide with the appearance of the background picture, you'd simply line up the Cut effect for the Picture track and the Object track. You could even synchronize these events with a sound effect that would begin playing when both picture and object appear on the screen.

DeluxeVideo measures time in *jiffies*—one-sixtieth of a second. On the Video Script and Scene Script windows, time is the horizontal coordinate. The farther to the right you place an event, the later the event will occur.

Technical Stuff

DeluxeVideo uses the Amiga dual-playfield mode. The background picture and foreground objects occupy different playfields and have different palettes. To conserve space, the playfields are limited to three bit planes, resulting in eight colors each. If you want to use pictures or objects that use more than eight colors, DeluxeVideo has an optimizing routine that will convert 16- and 32-color images into eight-color ones. You can also adjust playfield palettes to maximize the color fidelity of imported pictures and objects.

Video Tools

You can use many different hardware and software tools to enhance videos produced with DeluxeVideo Construction Set. You can use the Amiga Genlock to overlay your videos on signals from a video source. You can also use digitized pictures created with the Amiga Live! or Digi-View framegrabbers. Any IFF picture file can be used with DeluxeVideo.

DeluxeVideo can also use sampled sounds created with any of the sound digitizers, such as Applied Visions FutureSound or the Mimetics Sampler. Although sound samples take up a lot of room in your Parts Pool, they can add some great effects to your videos.

On the software side of things, any painting program that outputs IFF files can be used to create objects and pictures for DeluxeVideo. The same holds true for song and instrument files. You can compose sound tracks for your videos with any IFF-compatible note editor.

Composing songs is difficult, however, if you don't know much about music. In that case, you can use a new program—also from Electronic Arts—that lets you create music regardless of the level of your musical knowledge. The program is called Instant Music. It comes with about 60 songs that you can modify and play to your heart's content. The thing that sets Instant Music apart from note editors and other composition tools, however, is that it takes care of details like tempo and tune. All you have to know is what you like; Instant Music does the rest. If you're not a composer, Instant Music is the perfect program to create music for your videos. In fact, it may be the perfect music program for anyone who likes music but doesn't know enough theory to use the sophisticated note editors for the Amiga.■

To use pictures, objects and sounds in a video, they must be in memory. DeluxeVideo stores them in an area called the Part Pool. You can reserve up to 200K for your Part Pool. Using Load and Fetch effects, you can fill up the Part Pool while titles are being displayed, thus minimizing disk access during animation and other time-sensitive operations.

The maximum size of a video created and edited on floppy disk is half the disk. However, with a high-capacity disk, you can edit videos that will occupy an entire floppy disk.

Speedy Videos

Player lets you play back videos at varying rates of speed. Normal speed stops the internal timer for things like disk access; it pretends that these outside delays don't exist. Real-time is just that; in this mode, the timer runs the video in real-time. You've got to be sure that all parts for a specific effect are in memory before that timer begins the effect.

You also have three speeds that make it easy to use DeluxeVideo with VCRs and tape decks. For those machines that can record at 1/2 and 1/4 speed, DeluxeVideo will run at those speeds. DeluxeVideo will also step through a video one frame (1/30 of a second) at a time. This lets you record very high-quality videos on single-step tape machines.

When running in normal time, the number of different frames that DeluxeVideo displays in a second is dependent upon the complexity of the video. It can create up to 20 frames-per-second when using objects and pictures. Polygon Text, on the other hand, can slow things down to as little as four or five frames-per-second.

Theoretically, a video created with DeluxeVideo can run for a little over eight days. I think you'll run out of memory and patience long before you butt heads with that constraint!

Who Needs It?

Electronic Arts believes that the production of "desktop videos" can be as important in the Amiga market as desktop publishing is to the Macintosh. They expect to sell DeluxeVideo Construction Set to four major markets—two vertical and two horizontal.

Cable and low-end transmission TV stations can use DeluxeVideo in combination with the Amiga genlock as a character generator. Normally, video character generators have prices starting in the five-figure range. DeluxeVideo and an Amiga make an inexpensive solution. Another vertical market is ad agencies. They often have to produce "anamatics"—demos of how a commercial will look—before a client will agree to a particular ad strategy. With DeluxeVideo, they can produce anamatics for a fraction of current production costs.

Producing educational and presentation materials is a large industry in this country, and Electronic Arts expects DeluxeVideo to wind up in many corporate training and graphic arts departments. By using the Control effects (Chain, Keywait, KeyChain) you can branch to a particular video by pressing a button on the Amiga keyboard. These control features could make DeluxeVideo useful in interactive training situations, as well as in classrooms.

The last major market for DeluxeVideo is the home market. Millions of VCRs have been sold in the past few years, and the introduction of low-cost, light-weight video cameras has created a new class of hobbyist—the video enthusiast. These people can use DeluxeVideo to spruce up their own video productions with titles, credits, music and animation. DeluxeVideo even has a half-dozen built-in Scene Generators—video templates—that make it child's play to create titles, credits, even animated pie charts! And there are those who will simply want to create videos to run on their Amigas for the fun of it.

Wait and See

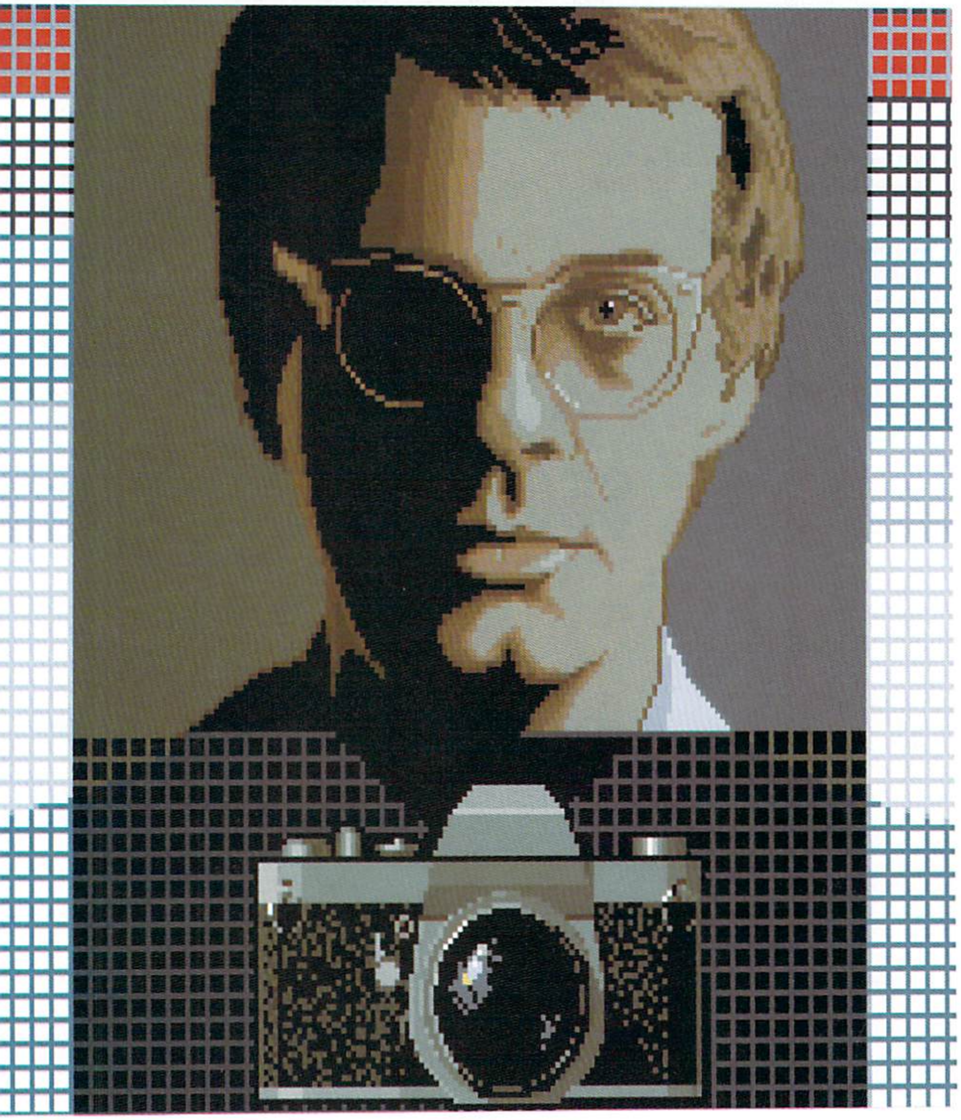
DeluxeVideo is such a departure from conventional software that no one is exactly sure what it will be used for. With DeluxeVideo, anyone with an Amiga has the tools to create sophisticated video sequences. Like all good tools, DeluxeVideo lets you concentrate on the creative side of things while it takes care of the details. DeluxeVideo Construction Set promises to be a very unique program, maybe as unique as the Amiga itself.■

Please note: This is not *a review, but a preview based upon the writer's first impressions of the pre-release product.*

Deluxe Video Construction Set
Electronic Arts
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415/571-7171
$99

Digital Canvas

This month's Digital Canvas features the work of Jim Alley, Professor of Computer Art at the Savannah College of Art and Design. Jim oversees the college's new Amiga computer lab.



Self-portrait with camera

Jim Alley teaches classes in both computer literacy and computer graphics, but he is quick to point out that he is primarily an artist rather than a "hacker." There are currently 24 Amigas in The Savannah College of Art and Design's computer lab.

The work that Jim is doing now on the Amiga is a synthesis of his earlier work in paint and photography. "The computer allows me to achieve effects that would be tedious to accomplish in other media," he says. The portraits presented here were executed mainly with DeluxePaint.

Alley's students share his enthusiasm for the Amiga. "The students are doing some exciting things. We have people here with a wide range of skills, from illustration and painting to architecture, interior design and historic preservation. All of them are finding the Amiga to be a useful tool. Weaving students can experiment with patterns. The photography students are eagerly awaiting the arrival of the digitizers we have ordered. And we're just beginning to explore the areas of video and animation.

"The lab is a great place to work. We have four Diablo color ink-jet printers, plus various others, such as the Okimate 20, as well as Epsons for text printing. We're looking into laser printers and plotters, too. We're in a restored building in Savannah's Historic District. It's an exciting place to be!" ■

Special Note: Anyone submitting artwork to be considered for exhibit in Digital Canvas should send the artwork on a disk and properly packaged to:

AmigaWorld
80 Pine St.
Peterborough, NH 03458
Attn: Art Director

Please include brief biographical information, relevant details about access to the pictures and any information regarding special products or procedures used in creating the artwork. *Please do not submit disks with less than eight finished pictures.*

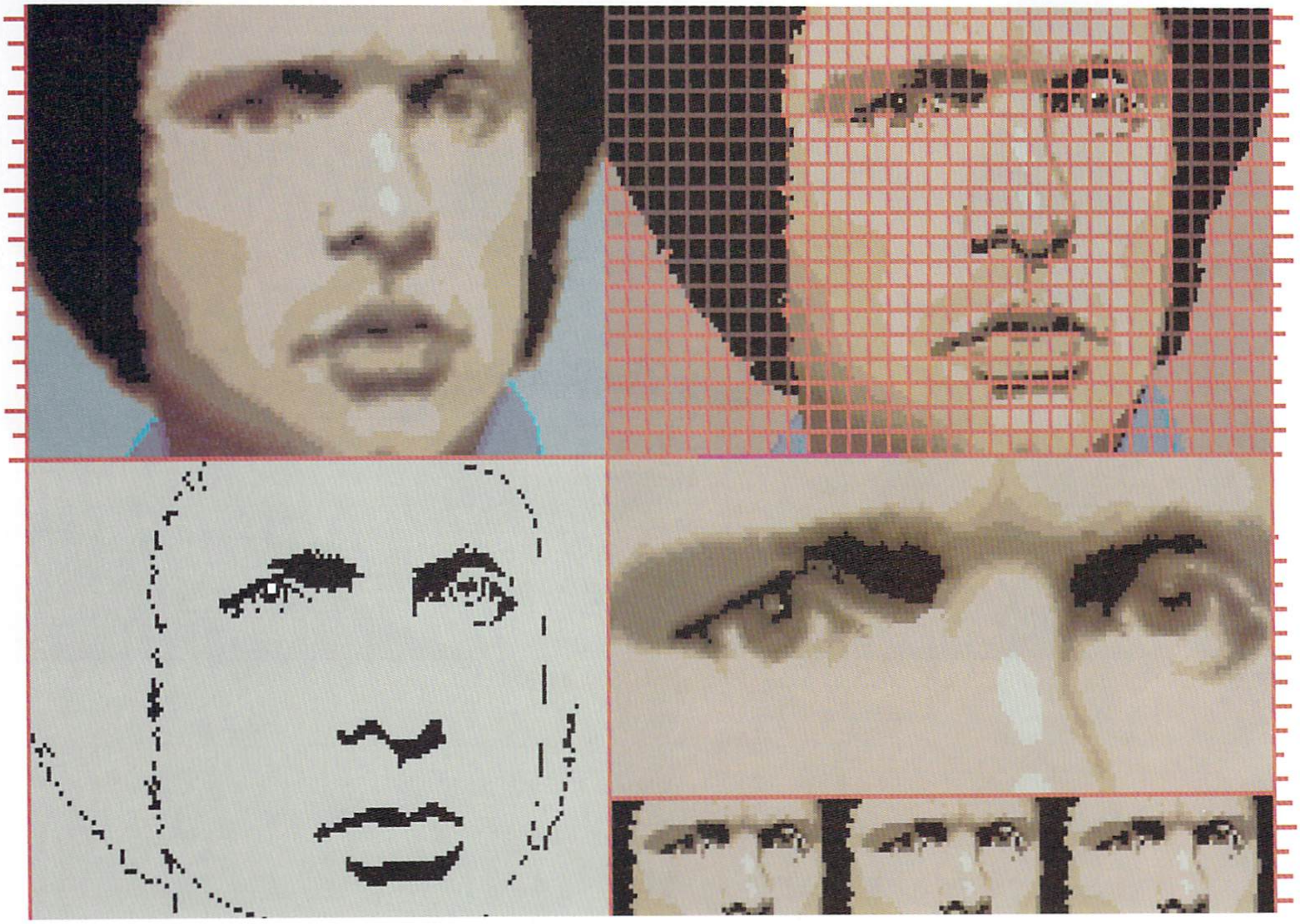


Majie #3



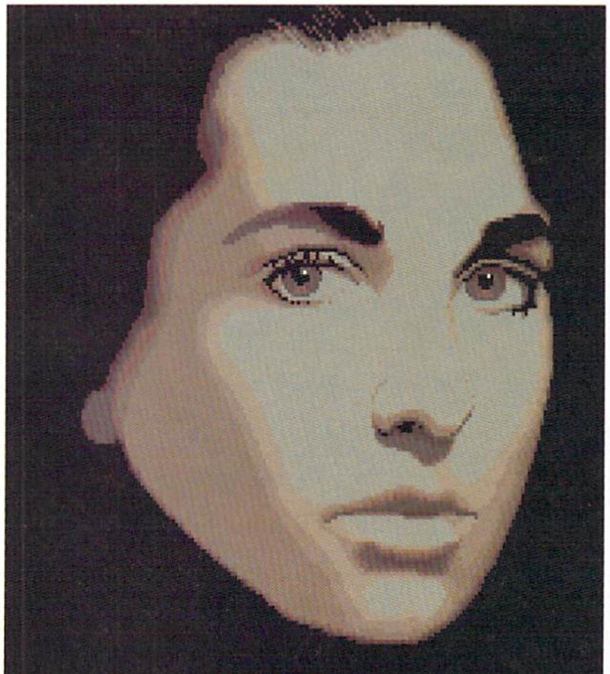
Randy (×4) in hi-res

Paul (grid)





Self-portrait (× 12) in hi-res



Majie #2



Paul #2

Managing Your Information

By Mark L. Van Name and William B. Catchings

The Amiga offers easy-to-use and powerful information-management utilities that correspond directly to office filing techniques.

Computers once were thought of primarily as arithmetic engines, or "number crunchers." Today, however, they are seen as "information processors," where the information may be text, formatted data, voice or even good old numbers. As we store more information in our systems, managing that information well becomes more important. To accomplish this successfully, the Amiga offers easy-to-use and powerful information-management utilities.

Files is Files

The Amiga stores information as data in files. Though it may be useful to distinguish between files containing programs—the manipulators of data—and files containing data, both are just files.

The Amiga provides facilities for organizing information that correspond directly to office filing techniques. Sometimes these facilities can seem confusing because the two different operating environments of the Amiga—AmigaDOS and the Workbench—use different names for the same things. These differences exist to fit the styles of the two worlds: The Workbench is visually oriented, while AmigaDOS is much like a more "typical" computer. In the following table we show the relationships among the data organization structures of these two environments and a simple office.

AmigaDOS CLI	Workbench	The Office
data file	project	file
program file	tool	procedure
directory	drawer	file drawer
disk	diskette icon	file cabinet

The correspondence among the three worlds is not perfect. For example, many office procedures would not be implemented as programs, and vice versa. Also, the CLI only "sees" files, while the Workbench distinguishes between tools and projects. When you open a tool's icon, you start a program; when you open a project's icon, the Workbench automatically starts up the tool with which you created the project.

There are some files that you can access from the CLI that you cannot see when using the Workbench. No magic is involved here: You just can't get to a file from the Workbench unless there is an *icon* for that file. You may have noticed that in the CLI, a file's icon is in another file named *Filename*.info. For example, the icon for the file Textcraft is in the file Textcraft.info. (These .info files can contain other information as well, but we are concerned here only with the icon.)

Drawers or Directories?

The Workbench and AmigaDOS also offer different sets of file-organization commands and procedures. For example, there are two different diskcopy commands. The one you use from the CLI is stored in the C directory on your Workbench disk, while the one for the Workbench itself is in the System drawer. Both commands perform the same task, but in ways appropriate to their respective environments.

Whether you are in the CLI, the Workbench, or an office, filing operations are rarely very exciting or pleasurable. Typically, you move files from one place to another, copy them, rename them and so on. Sometimes, however, a system will offer a pleasant surprise, such as a simple answer to one of your pet peeves, or a particularly powerful or unexpected facility. The Amiga's two environments offer both of these.

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Wildcards or Patterns: Multiple File Commands

Have you ever wanted to copy all of the files in a directory that began with some letter? More generally, have you ever wanted to work on a group of files at once? If you're like most computer users, the answer is an emphatic yes. At the same time, the prospect of typing each command once for every file is often daunting.

Fortunately, AmigaDOS offers a number of CLI commands that allow you to work on multiple files at once. These commands include: COPY, DELETE, DIR, LIST and SEARCH. In all of these, you can replace specific directory or file names with a template that may identify more than one item. These templates are known in AmigaDOS as patterns, or sometimes as wildcards. These patterns are compared by AmigaDOS against the files or directories present, and those that match are taken as input to the command.

Looking at Patterns

Patterns are specified through the use of special characters in combination with normal file-name characters. Patterns are best understood by looking at and playing with lots of examples, but before you can understand the examples, you need to know what special characters they can contain. The following table lists the special characters and their meanings.

Special Character	Pattern Matched
?	matches any one character
#<pat>	matches zero or more occurrences of the pattern <pat> that follows it
%	matches the null string (e.g., use it in combination with others to allow some characters to be absent from a name)
<pat1><pat2>	matches a sequence composed of anything that matches <pat1> followed by anything that matches <pat2>
<pat1>|<pat2>	matches anything that matches either <pat1> or <pat2>
( )	used to group patterns

Any regular character (e.g., "A") in a pattern just matches itself.

There is one final special character, the apostrophe ('). You use this one when you want to treat one of the special characters as if it were a regular one. For example, if you wanted a pattern that would match a string containing a question mark, you would need to put the question mark in the string as '? or it would be interpreted as a special character. This character can be applied to any of the above, including itself, when needed.

A few examples will help to clarify how to use special characters to form patterns. First, let's look at #?, which is probably the most important one. This is the universal wildcard, as it matches anything. The # character matches zero or more of what follows it, and the ? matches any one character, so together they match a string of any number of any characters. Thus, the command LIST #? will give information about all of the files in the current directory. Similarly, the command LIST j#? will give information about all of the files in the current directory that begin with the letter "j" (including a file named just "j", if there happens to be one).

Since these patterns can be applied to directories as well as files, we could have the command:

```
COPY #?/#? TO RAM:
```

s will copy all of the files in all of the directories in the current directory to RAM: pseudo-disk.

omplex Patterns

o far we have looked at only very simple terns, but we can put together quite nplex ones. For example, the pattern:

?(mark|bill)#?

match any name that contains either string "mark" or the string "bill" somere in it. On the other hand, the pattern nark) will match any number of occurces of "mark", e.g., "mark", "markmark", arkmarkmark", and so on.

emember that if you want to use one of special characters as a regular character pattern, you must preface it with '. For mple, if you want to match all names have a question mark somewhere in m, you would use the pattern #?'?#?. The ding and trailing characters #? match thing at either end, while the '? charac match only a question mark somewhere he string.

he best way to become proficient with terns is to use them. Try various combiions in such commands as LIST. One d way to practice is to use patterns to y files to the RAM: pseudo-disk. Check nake sure you get what you expected, then type:

ELETE RAM:#?

lear it out so that you can start over. Be eful not to use patterns with the DE-TE command until you are very sure that know exactly which files you will be deng. With a little practice, you will find patterns can save you a great deal of ng time and effort.■

something like this: "I like this visual system very much, but I hate where this window and those icons appear." You may want your Workbench window always to be shorter, or wider, and with its icons rearranged, perhaps alphabetically in columns.

You can easily change where a window and its icons appear using the Workbench Snapshot facility. First, make sure the disk the window resides on is *write-enabled*. To change the window's location, use the window's sizing and movement gadgets. To move an icon, use the normal method: point to it, hold down the left mouse button, move it within the window as desired, and release the button. To save the positions of multiple icons, you must move them using the Workbench extended selection facility. Move the icons around as before, but hold the shift key down the entire time. You will notice that each one you select will remain highlighted even after you release it. Release the shift key only when you are done moving all the icons you want moved. When both the window and its icons are arranged as you want them to be, enter the Workbench menu titled Special and choose the choice Snapshot. From then on, that window and its icons will appear in those new positions.

CLI: Not Pretty, But Powerful!

While the CLI seems less glamorous than the Workbench, it does offer a number of powerful and yet simple features. Many times you may not remember where a file is, or exactly what is on a disk. The AmigaDOS DIR command comes in handy here as an easy and simple general file browser.

To browse through a disk or any directory on it, just type:

DIR *Disk or Directory Name* OPT = I

Above, you would refer to a disk drive (e.g., DIR DF1:) or a file directory (e.g., DIR System). The I option stands for *interactive*. This useful command will take you through all of the files and subdirectories in the named directory, one by one in alphabetical order. The name of each will be presented to you followed by a question mark. If the name is that of a directory, (dir) will appear after it and before the question mark. For example, if you typed:

DIR DF0: OPT = I

with your Workbench disk in the internal drive, you would probably see:

c (dir) ?

►

Oops. We Goofed!

In the last installment of info.phile, our very first one, we made an error. Sigh. Through the evil of sloppy testing we gave you some incorrect information in the sidebar titled "Stopping the World from Passing You By."

We were discussing ways to stop output from scrolling by too quickly while in the CLI. Our advice (hit the space bar to stop it and the DEL key to resume) was fine and is still the recommended approach. However, our explanation of why it works was incorrect.

Why It Works

Here's the straight scoop. When you type in the middle of some output, AmigaDOS suspends the output and puts you in an input mode. You are now typing ahead of the next command. It will keep listening to what you type and hold the output until you in some way finish.

You can finish in one of three ways. First, you can hit the return key; the output will resume and the command you typed will be processed when that output is done. The other two methods cancel the command so that, in effect, you have typed in nothing. You can enter CTRL-X, which will delete all of the characters you have typed, or you can use the DEL key to delete all of the characters you typed. In either case, the output will resume. Our solution worked despite our inaccurate explanation because the space bar started a command and the subsequent DEL key deleted the last (and, in this case, only) character of that command and so finished it.

This mechanism is a nice one because it allows you to type commands when you wish to without having the characters you type strewn throughout the output you are viewing. Once again AmigaDOS provides us with a nice facility.■

◄ You can enter several commands after the question mark. Some work whether the name refers to a directory or a file, while others work only on one of these two types. (By convention, we show all of the commands and options in uppercase, but in AmigaDOS that is not required.)

If the name shown is a directory, you can browse its files by typing E after the question mark. Any files it contains will appear beneath it, slightly indented. If you encounter a directory that is empty, you can type DEL (the characters D-E-L, *not* the key labeled that) and delete it.

If the name shown is that of a file, you also can type DEL (as above) and delete the file. Be careful, you will get no chance to reconsider. If you would like to look at the file's contents, type T. This is equivalent to issuing the CLI command TYPE. As always, you can terminate the output early by typing CTRL-C, or you can view the entire file. Either way, you will be returned to your browsing and given the same file's name again. Thus, you could, for example, look at a file and then decide to delete it, all without leaving this one CLI command! With these capabilities, this command moves from being just a viewing utility to one that you can use to clean up and maintain your disks and directories.

Options with I

With the I option, several further options are always available. If you hit the return key after the question mark, the next name on the list will be presented to you; if the name denotes a directory, you will not see any of the files in that directory. If the name is the last one, the command will terminate. You also can finish browsing at any time by typing Q after the question mark. Finally, you can type B to take you back up a directory level and on to the next file there. If you are already at the highest directory, the command will stop.

The I option of the DIR command provides a convenient way to search for files and perform simple disk and directory maintenance. Like the Workbench Snapshot facility, it is one of the many ways in which the Amiga makes routine chores easier and more pleasurable.■

Address all author correspondence to Mark L. Van Name or William B. Catchings at 10024 Sycamore Road, Durham, NC 27703.

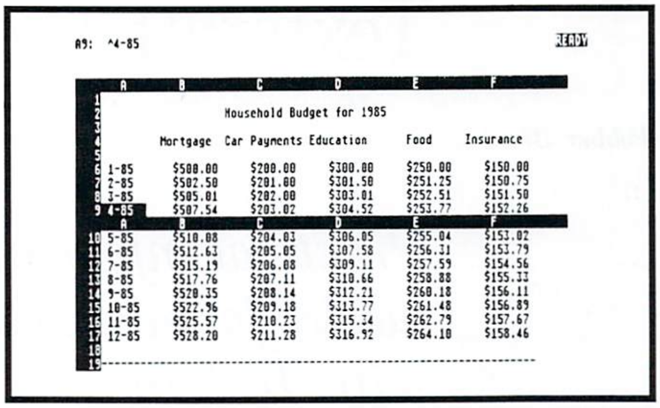
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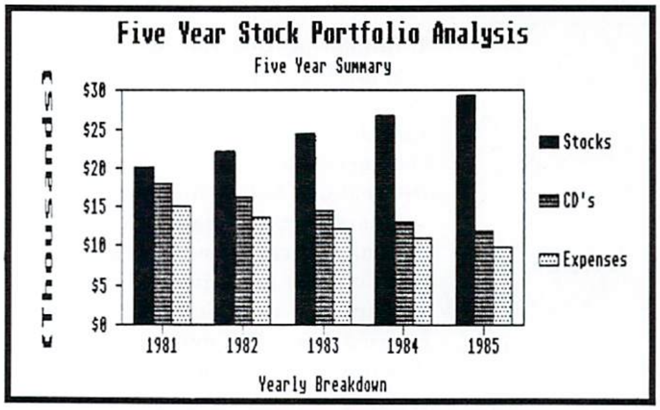


A9: ^4-85 READY

Household Budget for 1985

	Mortgage	Car Payments	Education	Food	Insurance
1-85	$500.00	$200.00	$300.00	$250.00	$150.00
2-85	$502.50	$201.00	$301.50	$251.25	$150.75
3-85	$505.01	$202.00	$303.01	$252.51	$151.50
4-85	$507.54	$203.02	$304.52	$253.77	$152.26
5-85	$510.08	$204.03	$306.05	$255.04	$153.02
6-85	$512.63	$205.05	$307.58	$256.31	$153.79
7-85	$515.19	$206.08	$309.11	$257.59	$154.56
8-85	$517.76	$207.11	$310.66	$258.88	$155.33
9-85	$520.35	$208.14	$312.21	$260.18	$156.11
10-85	$522.96	$209.18	$313.77	$261.48	$156.89
11-85	$525.57	$210.23	$315.34	$262.79	$157.67
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SYSTEM REQUIREMENTS: Amiga with 512K; One disk drive; Monochrome or color monitor; Works with printers supported by the Workbench.

Textcraft Tricks

By Pebber Brown

Practical information and good sound advice for everyone who does word processing with Textcraft.

1. Initializing Textcraft for two drives

Many Textcraft users have been trying to load and save files to an external data disk as one would naturally do with a system with two drives. However, Textcraft needs to be initialized for working with an external disk before this can be done.

To initialize Textcraft for two drives, simply re-boot the entire system (press the CTRL and both Amiga keys) with Textcraft in the internal drive. After the Textcraft icon appears on the screen, insert the data disk in the external drive. (You must have previously initialized the data disk.) Now position the mouse pointer over the Textcraft icon and click the left button twice. What you should now have is the Textcraft window opened up on the screen. Before clicking on Textcraft inside this window, simply click the left button only once on the data-disk icon. (The data-disk icon should now be colored black.) Now, hold down the left-shift key and click twice on the inside Textcraft icon. Textcraft will now be initialized to load and save files to an external data disk.

2. Saving Textcraft files as straight ASCII

You can also use Textcraft to write ASCII files to be sent through the serial port on the Amiga by simply selecting the Text Only option on the Save menu. Please remember to place the cursor at the beginning of the file before saving it. Many users have had file problems due to incorrect cursor placement while saving.

3. If you're using either a Star Micronics Gemini 10/15-X or an Okidata printer (but *not* an Okimate 20)

Both the Star Gemini and the Okimate require Preferences to be set to straight Epson code. However, one cannot simply print straight away from Textcraft. To print using either of these printers, you need to save the file first, clear the memory by selecting New Document on the Project menu, load the document that you've been working on, then select Print Document. Your file should then print without any problems.

4. Printer Compatibility

The Preferences menu has a wide selection of printers to use with the Amiga. However, there are some quite popular printers that aren't listed on the Printer menu that take the same codes as the listed printers. Here is a small table of compatible printers and codes:

Printer	Set Preferences to:
Epson DX-10, DX-20, DX-35	Diablo 630
Citizen Printers	Epson
Star Micronics Gemini	Epson
Comrex CR-IIE	Brother HR15 XL
Okidata 192, 193	Epson

Special notes on the Star Micronics Gemini 10-X: Set the Gemini 10-X to 59 lines per page in both Workbench Preferences and Textcraft. In the Preferences Graphic Select menu, set the Aspect to Vertical. This will allow the Gemini 10-X to page properly and allow multiple copies to be made.

5. Naming files so you can figure out what they are later

One area where many users are sloppy is in the way they name files when saving to disk. You might stash away a disk for a week or two and then later load it into the computer to see if a certain file is on it. Unless you have been using an organized method of naming ►

◄ your files, it can become difficult or impossible to tell what is in a particular file simply by looking at the file name. For example, if you typed a letter to your Mom last week and you saved it as "Today", you would probably have to load the file and begin reading it to figure out what it is.

The most popular way to name files has actually been around for many years. People who have a background in mainframe or minicomputers are familiar with what I am talking about. You simply use the "dot" prefix before the file-title extension. (Dot simply means a period.)

You begin with your file name, such as "Bob", "Mom", "Aegis1", or whatever you choose, and then a dot or period, and then the type of file that it is.

The letter you typed to your Mom would be named "Mom.ltr". With this method, you can scroll through all of your files on the screen and see exactly what kind of files they are. The reason that you use a period instead of a space is that computers read a space as an "end of name terminator." It reads a space as a separator between words, so that "Felix Cat" is read as two separate words.

In other words, a file called "Felix Cat" would only be read by the computer as "Felix", whereas if you had named it "Felix.Cat", it would read the full name. The period is read as a single character in the entire word. This is especially true with mainframes and IBM compatibles. Textcraft, however, will read the file in whatever way that it is named, unless the file is saved as an ASCII file. To save the file as an ASCII file, you have to name it using the dot prefix in order for that file to be read by another computer.

This technique has been used by programmers and developers for quite a long time, and there are a few standard mnemonic codes that seem to be generally accepted as common file extensions. Some of them are:

File extension	Description
File.txt	standard ASCII text file
File.doc	document file
File.dbf	database file
File.ltr	letter
File.BAK	backup file
File.bas	Basic program
File.pas	Pascal source code
File.c	C source code
File.o	C object code
File.obj	object code
File.asm	Assembly-language source code
File.zzz	"snooze" file to be read later
File.rpt	report
File.gph	graph
File.tbl	table
File.ttl	title page
File.inv	inventory file
File.trm	term paper
File.dwg	drawing description
File.tst	test file

As you can see, the ways that this method can be used are up to the imagination of the individual. The benefit from using this method is that you will be able to look at the directory of a particular disk and see exactly what kinds of files are on that disk.

A popular alternative to using the dot prefix is the underscore, or underline prefix. With this method, Felix.Cat would be named Felix_Cat.

6. Using Textcraft as an advanced editor for Pascal or C programming

Although the Amiga is equipped with a built-in text editor, you may prefer to use Textcraft as an editor for writing code. Textcraft works extremely well for this. The Sun cross-development system that the Amiga's operating system was written on uses a high-resolution monitor that resembles the way the screen looks in Textcraft. The black text on a white high-resolution screen is preferable for long hours of late-night coding, because on an RGB color monitor such as the Amiga monitor, the pixels are hidden when you use black for the text color. This effect prevents much of the fatigue and eyestrain that develops over an extended period of time. You can tone down the monitor so that the background color is comfortable for the eyes, while at the same time creating highly readable text.

To use Textcraft as a programming tool, simply write your code on the screen as you would with the regular editor. The advantages of Textcraft over the editor are readily apparent when you try to either cut and paste or use any editing feature not contained directly within the Workbench text-screen editor (ED). Code-development time can be reduced by doing it in this manner, since you will be sparing yourself a lot of eyestrain. Code must be saved as "text only" to be used by a compiler. Pascal source code must be given the mnemonic extension .pas, C source code must be given the extension .c, and Basic programs must be given the extension .bas. Save your source code as text only, and then compile it with either the Lattice, Metacomco or Aztec compiler.

To edit code or files in Textcraft that have already been written using the Workbench editor (ED), you have to re-boot with Workbench, call up the CLI, and at the CLI prompt, type TEXTCRAFT *filename*. Before you press return, you *must* insert the Textcraft disk with the current file on it. If your Textcraft disk doesn't have the CLI file on it, you have to do a DOS file copy to that disk before Textcraft will read it. After you copy the necessary CLI files to the Textcraft program disk, load them with the above procedure. After your CLI files are loaded into Textcraft, put the cursor at the *top* of the file and then save it to df1: by opening the project menu, selecting Save and then typing DF1:*filename* in the title box. This will now save the CLI file to an external data disk as a Textcraft file. Among most programmers, the "hip" way to name files is with the .prefix after the file name. Also, if there are many chapters to a file, it helps to name them as Chapt1.txt, Chapt2.txt, Chapt3.txt, etc. Once again, using logical mnemonic names for file extensions makes it much easier for you to keep track of your work.■

Address all author correspondence to Pebber Brown, c/o Aegis Development, 2210 Wilshire Blvd., Santa Monica, CA 90403.

Reviews

Flow

This idea processor for the Amiga is a good tool for organizing, brainstorming and projecting your ideas.

Reviewed by Erv Bobo

Though it is billed as an *idea processor* and is probably thought of by most people as an *outline maker*, Flow, from New Horizons Software, is a product with brainstorming and "what-if" capabilities that could well make it an invaluable addition to your Amiga software library.

Similar to the very successful MS-DOS product ThinkTank in it's on-screen layout and action, Flow achieves a greater ease of use through the application of the mouse and pull-down menus—the by now familiar Intuition interface. And because it is easy to use, you'll be drawn back to it again and again.

Stream of Consciousness

Okay. But at some point in elementary school, you were very carefully taught how to outline a project, a chapter, or an entire novel. Today you find it easy to take the few rules you remember and jot your notes on a piece of scrap paper, and you've been getting along just fine. So why bother with another computer program that must be booted and opened and who-knows-what-else before you can write your first note?

You'll find your answer in the Examples Drawer of the Flow window. Once it is opened, choose the file called Amiga Magazines. Now your window is the entire screen and you see two listings: *AmigaWorld* and *Amazing Computing*. The cursor, shaped somewhat like an I-beam, is resting next to the *AmigaWorld* listing.

With the mouse, pull down the SubMenu menu and click on Expand. Now each issue of *AmigaWorld* is listed; you'll notice these are in bold type. Set the cursor next to any listing and click on Expand. Now that part of the file opens to show you a complete table of contents of that issue. Further, had you chosen Expand All from the pulldown menu, every issue would have been opened and you could have scanned the contents of all of them.

Expanding and Collapsing

Were it not for this ability to expand and collapse files, most of what Flow offers could be duplicated with any word processor. Because it does have this ability, it can save you time and effort—first in locating a file from the broad heading, then in locating specifics through the opening of the more topical subheadings.

Creating a file is easy. As you begin a new document, your cursor is at the far left of the screen. Type in your title and press return. Now, for your first subheading, tab once. As you do this, the program interprets your first line as a heading and changes it to bold type. After typing your subheading and return, you may get to the body of your outline by tabbing twice. Once again, the operation of the tab tells the program that the line with only a single indentation is a subheading and transforms the line to bold type. So long as you are writing the body of the outline, your cursor begins two indentations into the form. When you wish to create a new heading or subheading, simply go to the pulldown menu and select Unindent. In the example given above, you'd do this when the article listings for one issue had been completed and you were ready to start on the next issue, identifying it with a subheading.

Those outlines you did in school would have been easier had you written each entry on a separate strip of paper, allowing you to rearrange them at will. And so it is with Flow. Because the program gives you the same Cut, Paste and Copy functions you would expect from a good word processor, your rough notes can be moved, rearranged, copied and deleted, giving you freedom to engage in "what-if" exploration and to change the order and the. . . well, flow. . . of your document as often as you like.

With the pull-down Search menu, you may find a particular heading by typing the name or a keyword in the requester box. The first occurrence of that name below the cursor will be highlighted; and, if you suspect you have more entries that are similar, you select Find Next. Since this works only on a file that has been expanded, it would be more useful on longer files; with a short file, visual scanning is probably faster.

From the same menu, you can select Sort, to sort all entries in a file; the requester window then gives you the option of ascending or descending alphabetical order.

Printing Your Thoughts

Along with the many ways of opening or searching a file, there are also many ways in which to print a file. When you select Print from the pull-down menu, you'll get a hardcopy of only what is open at that particular moment, allowing you to make your report as succinct or verbose as you like.

Because Flow resides on a Workbench 1.1 diskette, it will boot immediately after Kickstart; because it runs in only 256K of RAM, it will run concurrently with many other programs that share the Intuition interface. This would allow you to work with a word processor, for instance, with Flow running behind your workscreen, permitting you to flip screens and consult your outline as often as necessary.

It is recommended that you make a working copy of Flow and place the original copy in a safe place. Because Flow is on a Workbench diskette, this is easily done with the standard diskcopy routine. These same attributes will allow for easy installation on a hard disk, so the program will be quickly available whenever you need it.

Documentation is sparse, about 48 pages, but even that is more than you'll really need. Go through the first section, follow-

ing the examples given, and you'll probably have the program mastered. If not, read the other 30 pages and you'll certainly have it.

Coming to Conclusions

Although I've always been one of those to grab for a piece of scrap paper, I quickly became converted to the use of Flow as an outline processor. Seeing my ideas on the screen and in print, and having the ability to quickly move, delete and rearrange topics has proven to be a spur to the generation of still more ideas and has allowed me to consider various new ways of doing things.

Although "what-if" is a term usually reserved for spreadsheets, it is a very viable part of idea processing. Flow makes its application quick and easy.■

Flow
New Horizons Software
PO Box 43167
Austin, TX 78745
512/280-0319
$94.95
No special requirements

Amiga Transformer

Commodore's so-called trump card *is no ace in the hole, and, in light of the coming Sidecar, looks like a lame-duck product.*

By Mark L. Van Name And William B. Catchings

When the Amiga was introduced, there was a lot of hubbub about a mysterious card Commodore supposedly had up its sleeve. This was not just any card, it was their Trump Card. A Big Blue trump card. We're talking, of course, about software—the IBM Emulator—finally dubbed by Commodore as *The Transformer*. According to the announcements, the Transformer would run "popular IBM-PC software," and emulate many of the capabilities of the IBM PC. With one or more Commodore 5 1/4-inch disk drives, you would be able to tap into the huge library of software available for the IBM PC.

The Transformer, developed by Simile Research, would be available soon after the Amiga's launch (Fall '85), so you could quickly get down to real serious business. (Surely everybody knows by now that unless your micro is "IBM-compatible," you cannot expect it to be taken seriously by the hosts in three-piece suits.) Commodore obviously had big plans for the Amiga in the business world, and the Transformer would sweep away any obstacles in the path to a solid niche there. The prickly issue of IBM-compatibility *seemed* to be pretty well wrapped up.

Fifty-two Pickup

Then the nice neat wrappings started to unravel. The Transformer was late. Dealers got demo-only, not-for-sale test copies in November 1985—already several months overdue. Copies for the public would not be available until May 1986, six months later. So much for early availability. Reports about pricing ranged from $99–$400; the product finally arrived bundled with Commodore's 5 1/4-inch drive for $495 (suggested, but you can buy it for $200–$400). As for PC-compatibility, the best indictment comes from Commodore itself. The manual lists just 13 IBM-PC programs that *should* run, and repeatedly states that no others are guaranteed to work. (As we show below, even what it is able to do it does slowly.) Then came the final blow: Commodore's announcement of the Amiga Sidecar, a hardware option that provides 100% IBM PC-compatibility and will be available in late 1986.

The writing on the wall is clear: The Transformer is an orphaned product, one that was shipped purely because Commodore made a public commitment to doing so. If you want to run IBM-PC software on your Amiga, wait and buy the Sidecar—it is based upon proven products (the IBM PC-compatible computers Commodore markets in Canada and Europe) and is clearly part of the future direction for the Amiga. Our advice: Unless you absolutely *must* run one of the supported IBM-PC programs before the Sidecar is available, avoid the Amiga Transformer.

Calling the Bluff

At first glance the Transformer looks good. It can make your Amiga pretend to be an IBM PC with a monochrome monitor. You can use up to the PC-DOS limit of 640K of main memory, although you need over 1MB of Amiga memory to have access to 640K for PC emulation. It maps all Amiga keys to IBM-PC keys, with a bonus cursor pad. You can use the Amiga serial and parallel ports. It offers all PC-DOS and PC-BIOS interrupts (basically, the operating system and support routines), and direct control over PC screen memory and typical devices.

The Transformer also supports several ways of storing data. You can use standard IBM-PC 5 1/4-inch disks with the Amiga 1020 drive or format your Amiga 3 1/2-inch disks as 360K PC disks. If you have a version of PC DOS that supports the higher density 3 1/2-inch PC format used by the Data General/One and other systems, you can use disks with that format.

And, of course, you can run any of the listed 13 IBM-PC programs, as well, presumably, as others. While we did not test all of these, those we did test ran successfully.

Cards on the Table

Unfortunately, the Transformer's flaws outweigh its virtues. It will not run any program that uses any service from the IBM-PC ►

ROM (Read Only Memory—provides functions similar to those of the Amiga Kickstart disk). This excludes a large number of programs. The Transformer also uses the entire Amiga, so you can kiss multitasking goodbye. (Contrast this with the Sidecar, which was shown at the Spring Comdex running the Microsoft Flight Simulator in one Amiga window!) The Transformer is also missing several basic PC functions. You must run programs as if you have a monochrome monitor, despite the fact that both the Amiga and the IBM PC can support color monitors. Even that emulation is incomplete, as you cannot have character underlining or blinking. Serial printers are not supported. Your mouse is useless, even though many PC applications now support a mouse.

The Transformer comes with a Preferences program that lets you configure your pretend PC just by following menus and picking options. This is a nice idea. Unfortunately, many options, such as those that deal with the above deficiencies, are ignored "in this release." The ability to assign Amiga drives to DOS drives as you choose is a welcome exception. Even when the Preferences program works, it behaves very differently from its obvious cousin, the Workbench Preferences program. Rather than clicking on desired options with your mouse, you must flip between them with the arrow keys and the space bar. You get to pick the background color, which is nice, but you must do so by hitting function keys to add numbers to color intensity displays while pressing the space bar to preview the results. Where are the simple drag bars, with their immediate feedback, of the Workbench Preferences? The Transformer Preferences program unnecessarily invents a new (and poorer) Amiga interface style.

A Losing Hand

Finally, the Amiga Transformer is *slow*. In the list of the 13 programs in the manual, each program is accompanied by the number of *times* slower that it runs on the Amiga. All but one are listed as from two- to four-times slower; the one exception is said to be four- to six-times slower. These numbers seemed to be accurate, or even optimistic, for the programs that we tried. In addition, we ran three benchmarks of our own, one compute-intensive and two that exercised disk I/O. The Transformer was 7.8-times slower than a PC on the former, and 5.4- and four-times slower on the latter two. Software emulators of computers are generally slow, so this should be no great surprise, but it certainly is disappointing.

Folks, these are not twenty or even one hundred percent speed penalties, as were once rumored. These are multiple times slower, hundreds of percent worse. CPU-intensive operations, such as large spreadsheet calculations, seem as long as the wait for the Transformer's arrival on dealers' shelves. In a PC market rife with ever faster processors, the Transformer gives you the slowest PC-compatible system that we have ever seen or heard discussed.

A Better Deal: The Sidecar

The Amiga Transformer was a product with promise, but it is incredibly slow. Its Preferences program shows many interesting ideas, but most are not fully realized. Its user interface is unlike most Amiga software and is generally poor. The Transformer was very late, and now the vastly superior Sidecar is nearly upon us. While obviously more expensive, the Sidecar provides the true compatibility and reasonable performance with which the Transformer merely tantalizes us. Commodore and Simile combined to produce an interesting but critically flawed product. Commodore has clearly chosen a different future and the Transformer is an orphan. Put away your checkbook; do not buy this product.■

Amiga Transformer
Commodore Business Machines Inc.
1200 Wilson Drive
West Chester, PA 19380
215/431-9100
$495 (suggested)
Bundled with 5¼-inch drive

The Halley Project: A Mission In Our Solar System

Mindscape proves that educational software can *be fun.*

Although Comet Halley is speedily returning to the nether reaches of the solar system, its effects are still being felt here on Earth. Scientists of many nations are analyzing data from the armada of satellites that intercepted the comet; many of the people who awoke before dawn to see the comet have become confirmed star gazers. And Mindscape is still producing The Halley

Project—a program inspired by the return of the celestial celebrity.

The Halley Project is an engaging educational game. You are assigned ten training flights to prepare you for your ultimate mission. Each of the flights requires some prior knowledge of the solar system. For instance, you may be required to fly to a planet with no moons or a moon with an atmosphere; if you're not up on planetary astronomy, you'll have to do some research to complete your training missions. The Halley Project doesn't push information at you, it simply provides an incentive for you to learn on your own.

Celestial Navigation

To travel around the solar system, you use the Control Panel of your ship. The panel features a viewing screen that lets you see the constellations that lie along the ecliptic—the background of stars that the sun seems to move against while the Earth journeys around the sun. The viewing screen lets you line up your destination. For instance, if you know that your destination is Saturn, and you know that Saturn is currently in the direction of the constellation Cancer, you simply point your ship towards Cancer and rocket towards it.

You'll be able to recognize that pattern of stars that make up Cancer because the program comes with a Simple Star Map of the Zodiac—the constellations that lie upon the ecliptic. (Once you've used the Simple Star Map for awhile, you'll be able to pick these constellations out of the night sky.) You'll know that Saturn is in the direction of Cancer by referring to the Radar Screen, the second important display in The Halley Project. Your position is always at the center of the Radar Screen. Just find the sixth planet from the Sun, look to see which constellation lies beyond it on the line from your position, and you have the direction you have to set at the Control Panel.

Mouse in Space

The Halley Project for the Amiga lets you use the mouse to control your ship: All controls are at your fingertips. The screens for the Amiga are much nicer than those for other computers. The designers could have done a better job, however, of representing the various bodies in the solar system: Where are the distinctive rings around Saturn?

A complete documentation booklet comes in the package, as well as a handy star map, a briefing about your mission on cassette tape and a Halley Project registration card. Once you've completed your ten training missions, you can send the card to Mindscape and they will give you information about your final mission. Complete the final mission and you'll join an elite group of star pilots. You'll also be surprised at how much fun you've had learning about the stars and planets.■

—*AmigaWorld*

The Halley Project
Mindscape Inc.
3444 Dundee Road
Northbrook, IL 60062
312/480-7667
$49.95
No special requirements

Financial Cookbook

A fine collection of recipes for wise investments.

Reviewed by Ervin Bobo

There are those of us who are forever daunted by anything resembling a financial package, even one that limits itself to "personal finances." If we can be persuaded to use one, we tend to doubt the answers given and, at first opportunity, give the same problems to our accountant, pay the ►

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10. Announcer
A voice announces when a time consuming task is complete. Also "speak" text files as well as sentences you type in.

11. Graph Package
An easy to use graphics package that enables you to make charts and graphs on your Amiga. Create pie, bar and exploding charts from the rainbow of colors on your Amiga.

12. PopUp Cards
Handy reference cards that will pop-up over the workbench. Includes ABasic and AmigaDos reference cards, and more. You can also make your own!

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A highly interactive version of the game life. Now you can create your own universe populated with your creations.

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Dealer inquiries invited.

fee and accept his answers without question. So why bother with something that calls itself a *financial cookbook*?

Because it is easy to use and because it can be trusted.

Appetizer

Quite wisely, Electronic Arts decided to open Financial Cookbook with the Intuition Interface rather than the CLI. The natural reaction of an Amiga user, when presented with a screen of icons is, "I can handle this." Quite right. Once the program is running, pull-down menus display your many choices and the financial "recipes" are such that you simply fill in a few blanks.

However, Financial Cookbook is not just another home budgeting program. It will not tell you how much money is left for pizza and beer after you've budgeted for gas, electricity and laundry. Instead, the 32 recipes will guide you in selecting the type of savings or investment to give you the best return; the amount of life insurance needed to keep your family in style; whether to buy or lease or repair an automobile; and whether to rent or buy a home. Clearly, these are matters of some weight and importance to your future financial position, yet they are matters Financial Cookbook allows you to handle with ease.

Entree

Your first selection should be recipe One: Understanding Marginal Tax Rates, for this is a figure that will recur in every other recipe. You'll be paying taxes on every dollar of interest earned and, in order to give you a "bottom line" that has meaning, Financial Cookbook will take this into account. Simply fill in your taxable earnings and taxes paid, both federal and state, from your copy of your last tax returns and the marginal tax rate is computed for you.

The resulting figure, as well as current inflation rate and current interest drawn on savings, can then be saved on the Profile recipe. You can save them permanently to disk or use them temporarily; either way, they will be automatically inserted in each succeeding recipe.

You enter the figures in a window that states the problem, then use your mouse to point to a sub-window that says "Compute." Immediately, a second window opens, restating the problem and your input and giving you a "bottom line." For those of us who have used other computers, and have become accustomed to waiting while floppy disk drives moaned and groaned over an answer, the speed with which the Amiga presents a final tally may leave you with the feeling that you didn't get your money's worth. After all, you simply clicked a button and the answer was there: how much consideration could it really have given your needs?

In the Amiga, Financial Cookbook resides entirely in RAM and this accounts for the sometimes zero delay between problem and solution. Because it is RAM-based, Electronic Arts recommends that Amiga users with only 256K unplug external disk drives in order to free memory. This done, it is possible to have two input and two output windows open simultaneously—thus multitasking your finances. With 512K, no such limitations apply.

Although Financial Cookbook makes use of such arcane accounting procedures as Net Present Value, Internal Rate of Return and others, you won't find them mentioned here. Keeping in mind the type of user for which it is intended, the manual remains clear and concise and never descends into shoptalk.

Yet those concepts play a very important role in determining the bottom line. By utilizing figures on your marginal tax rate and the rate of inflation, Financial Cookbook presents you with what is, in effect, two answers to each problem: the amount of *real* dollars realized and the actual amount in terms of *today's* buying power.

Dessert

To state a very simple example of how this works, we will use the Single Savings

◄ Deposit recipe. Assume a savings account at 4% interest, compounded daily; a marginal tax rate of 41%; and an inflation rate of 4%. Since the inflation rate nearly equals the interest rate, we have a standoff: no loss, no gain. But you did earn interest and taxes upon it must be paid. Therefore, although the amount of real dollars shows a healthy increase, the amount of dollars in terms of today's buying power shows a decrease. If such figures were the best you could get on savings, it would be better to spend the money now. (And that's the kind of answer my wife loves.)

Obviously, both your tax rate and the rate of inflation could change drastically over the course of a long-term investment. However, Financial Cookbook, like any other financial package or spreadsheet, works with the best information currently available and thus serves as an easy-to-use guide to the future.

As to whether the program is worth your time and money, the best example I can give is from my own experience.

Plop, plop, fizz, fizz

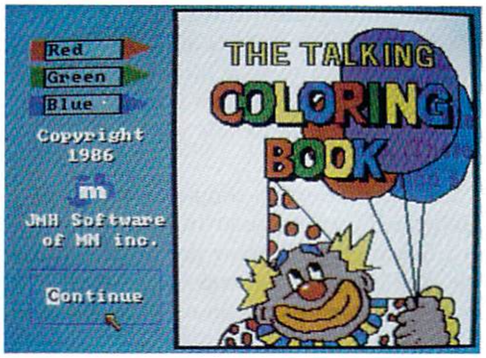
Left to my own devices, I'd have thought I lacked enough equity in my home to consider refinancing. Yet the recipe was there on the pull-down menu, only a mouse-click away, and I decided to give it a shot. The bottom line was this: If I refinance now, I'll not only gain the cost of Financial Cookbook, but also the cost of a new Oldsmobile. I'm going for it! ■

Financial Cookbook
Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
415/571-7171
$59.95
No special requirements

The Talking Coloring Book

An entertaining coloring program for small children.

The Talking Coloring Book from JMH Software of Minnesota Inc. is an entertaining graphics program for small children.



With it a child can draw and color pictures; as colors are picked, the color names are spoken.

Electronic Crayons

The program has four options: a *demonstration* that teaches colors and their names by displaying colors and saying their names; a *practice* option that says color names and asks you to choose that color from the graphic crayons on the screen (a wrong choice prompts the program to tell which wrong color you chose, and asks you to choose again); a *coloring* option, where you color (fill) pictures; and a *draw* option, which lets you draw with a black line. Unerasable pictures are included in the program and new ones can be drawn and saved for coloring also. This allows you to go back and change a drawing whenever you wish.

This program is very easy to use (no printed documentation is needed) and also very colorful. The speech feature adds a lot to the program; the voice is not very exciting, but also not intolerable. I have some

question as to the value of this program as primarily a color-learning tool; I think children old enough to achieve the necessary (though minimal) coordination with the mouse will be beyond the age when color identification is learned. However, as a child's Amiga coloring book program, The Talking Coloring Book is a very good product, and the speech enhances it.

If you are interested in introducing your child, or children, to the world of the Amiga, through the use of an easy-to-use yet colorful and responsive program, buy The Talking Coloring Book. The price is good, the program is entertaining and instructive, and you won't have to worry about crayola murals on your wallpaper.■

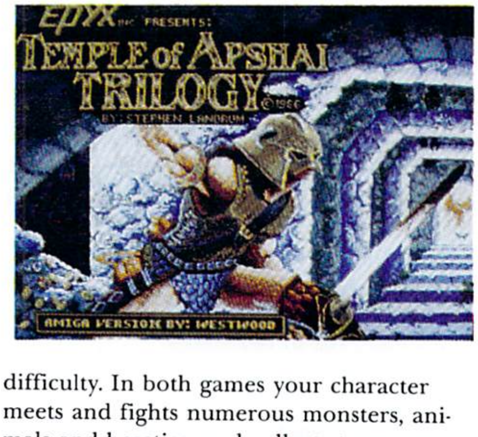
—*AmigaWorld*

The Talking Coloring Book
JMH Software of Minnesota Inc.
7200 Hemlock Lane
Maple Grove, MN 55369
612/424-5464
$29.95
No special requirements

Rogue
Temple of Apshai Trilogy

Do the Monster Mash through the mazes of two graphics action adventures.

Rogue and Temple of Apshai Trilogy are two new Amiga games from Epyx that are best described as a combination of maze, role-playing, arcade and fantasy. The two games are similar in that in each you have a character that explores mazes of varying



difficulty. In both games your character meets and fights numerous monsters, animals and beasties, and collects treasures, weapons, potions and experience. Your character gets stronger, wiser and better able to survive the successive levels where the rewards are greater and the dangers more deadly.

Different Strokes

The games differ from each other in minor ways. Rogue has 26 maze levels that are randomly generated each time you enter them; although the goal is always the same, the way there never is. It also has 26 different monsters that eagerly wait to do you in. The screens are not as graphically sophisticated as those in Temple (on the monitor, the characters of Rogue are only about an inch high), and it doesn't employ sound, but you have more fighting options in battles. The number of potions and scrolls that have different effects is also greater.

The Temple of Apshai Trilogy consists of three seperate mazes, each with four levels of difficulty. You wander through 568 rooms and are greeted by 37 different monsters. The battles, though more graphic than those in Rogue, present fewer options. Maze levels never change, so you should draw maps as you travel. As in Rogue, secret rooms and passages are discovered by searching walls. By returning to the Inn, you can trade your ►

◄ hard-won loot for better weapons, armor, healing salves and arrows.

Same Old Monsters

Both games will keep you busy for hours (if you wish to play them out to the bitter end), but unless you are very easily amused you will probably lose interest fairly soon. The monsters are the same, the rooms are the same, the treasures are the same, the battles are the same, and once you learn the few survival and exploration techniques, both games become repetitious. Of the two, I think Rogue is the more interesting, even with the lower-quality graphics. It offers more options and a few more puzzles to solve. Temple has better graphics, and since the levels don't change, they offer the challenges inherent in real mazes. Both games use pull-down menus and allow use of the mouse almost exclusively, or the keyboard, or both.

If you are a fan of this kind of game, then it is just a matter of deciding whether you want one with a set, definite end like Temple (which probably won't hold your interest once you have mapped all the levels), or a game that you can play over and over without exact duplication like Rogue.■

—AmigaWorld

Rogue
Temple of Apshai Trilogy
Epyx
1043 Kiel Court
Sunnyvale, CA 94086
408/745-0700
$39.95 each
Both require 512K

A Mind Forever Voyaging

Here's your chance to travel into the future, even if it's only in your memory.

It is the year 2031 and you are PRISM, the world's first sentient machine. You have "lived" an artificial childhood, been given an artificial family, artificial emotions and artificial teachers. You did not learn the truth about your identity—that you are a computer—until your twentieth birthday. "You are a computer, and your life was merely a simulation whose purpose was to instill you with intelligence and self-awareness." You were created, along with a very sophisticated simulation capability, to aid in the establishment of a working *plan* for the future of society.

Plans for the Future

The mission seems straightforward: You will enter into a simulation of the world as it might be in the future, to see how society will be influenced by the implementation of "The Plan." You will report your findings to the government and they will decide if "The Plan" is worth implementing. On the surface, the future scenario seems idyllic, but somehow you can sense that there is something wrong, and as time passes you get the feeling you should be doing something more than merely sight-seeing.

A Mind Forever Voyaging is an interactive text adventure with a screen or two of graphics. It is, according to Infocom's rating, for advanced players. Like all of Infocom's text games, it is of the highest quality. But it goes beyond that. There is something special about A Mind Forever Voyaging that is hard to define. I found myself spending a lot of time wandering around in the simulation of the future, exploring rather than solving problems. This story's "highly literary focus" makes it less puzzle-oriented and more of a bizarre journey.

The depth and detail of the simulated city of the future is amazing. For example, in the simulation you have an apartment (if you can find it) with a wife and baby waiting for you. There is a baby bottle in the refrigerator, paper in the typewriter (you are a science-fiction writer in the future) with part of a story you are writing on it, your wife has a half-finished painting on the easyl by the window, and on and on. So much detail is apparent that after wandering through the city, riding public transportation, visiting shopping malls and eating in restaurants, you want to go "home" to your family to rest.

Worth the Trip

Even if you never really solve the game, A Mind Forever Voyaging will have been worth playing. It is excellent, a very special and different sort of text adventure game.■

—AmigaWorld

A Mind Forever Voyaging
Infocom
125 Cambridge Park Drive
Cambridge, MA 02140
617/492-6000
$44.95
No special requirements

What's New?

Compiled by Bob Ryan

This issue, AmigaWorld *presents an abbreviated What's New. For information about other new products for the Amiga, see "The Amiga Shows Up" on page 70.*

Interactive Forth

Multi-Forth is an interactive system designed to help you develop sophisticated applications programs for the Amiga. Unlike traditional languages such as C and Pascal, Multi-Forth contains an interactive mode that lets you see what your program is doing as you're writing it. When your program is complete, you can easily turn it into a stand-alone application.

Multi-Forth gives you access to AmigaDOS and all Amiga library routines. Like all versions of Forth, the langauge can be extended by any programmer. The system also includes a 68000 macro assembler so you can optimize your code. Multi-Forth costs $179. For more information, contact Creative Solutions Inc., 4701 Randolph Road, Suite 12, Rockville, MD 20852. 301/984-0262.

Heavy Hitter

With a maximum speed of 60 characters-per-second, the **Juki 6500** can handle just about all of your business printing needs. This letter-quality daisywheel printer comes with both a serial and a parallel interface. A 3K memory buffer (expandable to 15K) is standard.

The 6500 has three character pitches (10/12/15) and proportional spacing. Unlike a lot of daisywheels, the Juki 6500 can also handle superscripts, subscripts, boldface and even graphics. The 6500 has a 16″ platen and weighs 37 pounds. It is a serious printer for serious applications. The Juki 6500 lists for $1,395. For more information, contact Juki Office Machine Corp., Printer Division, 23844 Hawthorne Blvd., Suite 101, Torrance, CA 90505. 800/325-6134 (in CA, 800/435-6315).

Alkaline-powered Amiga

Batteries Included has announced a number of new products for the Amiga. The first will be **BTS The Spreadsheet**, a fast, compact spreadsheet for people who don't need to model the entire U.S. economy (although you can do a lot with 1 million cells). Future Batteries Included products for the Amiga include **The Isgur Portfolio System**, an investment-management program, and **I*S Degas Elite**, a comprehensive painting program.

BTS The Spreadsheet retails for $69.95. The Isgur Portfolio System is expected to retail for $249.95 and I*S Degas Elite for $79.95. For more information, contact Batteries Included at 30 Mural Street, Richmond Hill, Ontario, L4B 1B5 Canada. 416/881-9941.

Hardware Number Crunching

Netech Computer Products is producing a relatively inexpensive way to integrate a 68881 math coprocessor into your Amiga system. The **Amiga/NCP Math Coprocessor** is based upon the 68010 chip instead of the much more expensive 68020. By using software to emulate the 68020-68881 interface, the NCP board achieves near 68020 speeds at less than half the cost of comparable boards. The Amiga/NCP Math Coprocessor plugs directly into the 68000 socket of your Amiga. An assembled unit retails for $529. For more information, contact NCP, PO Box 645, Monrovia, CA 91016. 818/334-1002.

Talk Back

A-Talk is a telecommunications and terminal emulation program for the Amiga. It features text and protocol transfers (Kermit, Xmodem), a script language for automated telecommunications and ANSI terminal emulation. A-Talk works with many popular modems and supports auto-dial, redial and auto-answer. It retails for $49.95. Contact Felsina Software, 3175 South Hoover Street #275, Los Angeles, CA 90007. 213/747-8498.

Filing Files

Disk Library and **Diablo** are two new software products from Classic Image. Disk Library keeps track of every file and drawer on every disk you own. It helps you find whatever file you're looking for with a minimum of effort. Diablo is an arcade game that requires a lot of strategic thinking as you maneuver a ball through a colorful maze of tracks and panels. It features strong graphics and sound.

Disk Library sells for $49.95 while Diablo sells for $29.95. For more information, contact Classic Image, 510 Rhode Island Ave., Cherry Hill, NJ 08002. 609/667-2526.

Tooling Up

Invotronics of Dallas, TX has introduced **M**, a package of four programs for the Amiga. MAscii is an on-line ASCII quick ref-

erence chart. MCalc is a programmer's calculator: It supports any base between (and including) two and 36. MEd lets you edit any byte in your Amiga's memory; you can even alter hardware registers. MDis is a disassembler for 68000 and 68010 object code. M lists for $59.95.

Also from Invotronics is **PowerWindows**, a tool that lets you create and edit Amiga windows. You can design windows with menus and gadgets, and have the result output as either assembly- or C-source code. PowerWindows lists for $89.95. For more information, contact Invotronics Inc., 11311 Stemmons Freeway, Suite 7, Dallas, TX 75229. 214/241-9515.

High-Flying MIDI

MIDI-Gold from Golden Hawk Technology is an enhanced MIDI interface for the Amiga. Unlike the Commodore MIDI, which features MIDI-In, -Out, and -Thru, MIDI-Gold has an extra MIDI-Out and a Sync-Out. MIDI-Gold connects to the Amiga serial port. It lists for $79.95. For more information, contact Golden Hawk Technology, 427-3 Amherst Street, Suite 389, Nashua, NH 03063. 603/882-7198.

Desktop Teacher

On the educational side, **Speller Bee** and **KidTalk** use speech synthesis to teach spelling and improve communications skills, respectively. Designed for students from preschool to junior high, Speller Bee provides a mix of games, practice routines and tests to improve spelling. KidTalk is an educational word processor. It speaks whatever is entered by the student—by letter, word, sentence or paragraph. More advanced students can compose stories and poems with the program also.

Speller Bee and KidTalk both list for $59.95. For more information, contact First Byte Inc., 2845 Temple Avenue, Long Beach, CA 90806. 213/595-7006.

Spanish Plus

Kwik-Speak I is a tutorial course in Spanish that uses the Amiga's built-in speech synthesis. Sold by Eclipse Data Management, it is based upon the Kwik-Speak method developed during World War II (when people had to learn foreign languages in a hurry). Kwik-Speak I is expected to retail for $50.

On the business side of things, Eclipse Data Management has announced **For-Trac** and **Rent-Pro**. For-Trac lets property managers track the different phases of the foreclosure process. It is expected to retail for about $2,250. Rent-Pro helps you manage rental property. It will list for about $2,000. For more information, contact Eclipse Data Management Inc., 312½ Lafayette Street, Glendale, CA 91205. 213/602-0516.

Good Software—Cheap

The **National Amiga Software Association** (NASA) has established a high-quality, public-domain software library for the Amiga. Based in Cambridge, MA, NASA is a non-profit group that utilizes the resources of the MIT student body to maintain and improve Amiga public-domain software. NASA intends to sell disks for under $5. For a current listing of NASA disks, or for information on making a contribution to the NASA library, contact the National Amiga Software Association, MIT Branch, PO Box 295, Cambridge, MA 02139.

Newsbriefs

Zoxso has released **ZLI** for the Amiga. ZLI is an upgraded CLI that incorporates advanced features like command history, definable function keys and keyboard macros. For more information, contact Zoxso, PO Box 283, Lowell, MA 01853. 617/655-9548.

Texture, the MIDI-sequencing software (*AmigaWorld*, November/December, 1985, p. 58) that disappeared with Cherry Lane Technologies, has reappeared with Musicsoft, PO Box 274, Beekman, NY 12570.

An APL Interpreter is now available for the Amiga. MicroAPL Ltd.'s **APL.68000** is being made available in this country by Spencer Organization Inc. You can contact them at 366 Kinderkamack Road, Westwood, NJ 07675. 201/666-6011.

Chang Labs has announced **Rags to Riches IV** for the Amiga. The upgraded packages will take advantage of the Intuition interface built into the machine. For more information, contact Chang Labs, 5300 Stevens Creek Blvd., San Jose, CA 95129. 408/246-8020.

Polarware has announced that they are reducing the prices of all their software products. For Amiga owners, this means you'll be able to buy **Transylvania**, **The Crimson Crown**, **The Coveted Mirror** and **Oo-Topos** for $29.95 instead of $39.95. Contact Polarware at 2600 Keslinger, Box 311, Geneva, IL 60134. 800/323-0884.

Normally, I try to list some **User Groups** and **BBS phone numbers**, but space is at a premium this month. For an updated listing of Amiga User Groups and Bulletin Board Systems, send a SASE to Bob Ryan, UG/BBS List, *AmigaWorld* editorial, 80 Pine St., Peterborough, NH 03458. I'll get a copy of my list to you.■

Hors d'oeuvres

Unique applications, tips and stuff

You may be using your Amiga at work, you may be using it at home, or you may be using it in the back seat of your car, but in some way or other, you are going to be using your Amiga in a slightly different way than anyone else. You are going to be running across little things that will help you to do something faster or easier or more elegantly.

AmigaWorld would like to share those shortcuts, ideas, unique applications, programming tips, things to avoid, things to try, etc., with everyone, and we'll reward you for your efforts with a colorful, appetizing, official *AmigaWorld* T-shirt. (Just remember to tell us your size.)

Send it in, no matter how outrageous, clever, obvious, humorous, subtle, stupid, awesome or bizarre. We will read anything, but we won't return it, so keep a copy for yourself. In cases of duplication, T-shirts are awarded on a first come, first serve basis.

So, put on your thinking berets and rush those suggestions to:

Hors d'oeuvres
***AmigaWorld* editorial**
80 Pine St.
Peterborough, NH 03458

Help Key

By Bob Ryan

Included this month is a solution for controlling your printer from Amiga Basic. If you have Amiga problems, we're here to listen. Unload them on us at Help Key, AmigaWorld *editorial, 80 Pine St., Peterborough, NH 03458. Take heart. . .someone cares. Chin up, lick that stamp, and march down to the mailbox.*

Basic Escapism

Q: I've been working with Amiga Basic and I've run into a problem. I am unable to send escape codes to my printer. All my commercial software works fine, but I can't get my printer to boldface or underline from Amiga Basic. Can you help?

Beverly Tranka
Gansevoort, NY

A: A lot of readers are having problems controlling their printers from Amiga Basic. The problem isn't so much with Amiga Basic or the Amiga device drivers as it is a problem of documentation. You can control your printer with escape codes from Amiga Basic. You just have to send the correct codes to the correct device.

First of all, the information in the Amiga Basic manual seems to be dead wrong. On page 5-3, it states that you can access the Amiga printer device by opening LPT1: . While opening this file does let you print, it doesn't allow you to control the characteristics of the printer. The same is true of the LPRINT and LPRINT USING commands: You can print with them, but only in your printer's default mode.

You can open one of three files (remember, Amiga Basic treats devices as files) in order to control your printer from Amiga Basic. The one you should use is PRT: . Depending upon whether you have a parallel or a serial printer, you can also use PAR: or SER: .

PRT: is the AmigaDOS printer device. If you write all your software to use this device, instead of trying to control your printer directly, your program should work with any printer that is listed in Preferences. To control a printer using PRT:, you don't send escape codes that are specific to any one printer. You send codes that are specific to the Amiga PRT: device. Using the printer driver specified in Preferences, PRT: translates the escape codes it receives from your program into the printer-specific codes needed to drive the Preferences-designated printer. The point to this method of doing things is that you (and your programs) need to know and use only one set of escape codes in order to work with any of the printers listed in Preferences. Put away your chart of Epson or C.Itoh printer-control codes. The only codes you have to know are those that control the PRT: device. These codes are listed in the accompanying table.

Printer Device Command Functions*

Name	Cmd No.	Escape Sequence	Function	Defined by:
aRIS	0	ESCc	reset	ISO
aRIN	1	ESC#1	initialize	+ + +
aIND	2	ESCD	lf	ISO
aNEL	3	ESCE	return,lf	ISO
aRI	4	ESCM	reverse lf	ISO
aSGR0	5	ESC[0m	normal char set	ISO
aSGR3	6	ESC[3m	italics on	ISO
aSGR23	7	ESC[23m	italics off	ISO
aSGR4	8	ESC[4m	underline on	ISO
aSGR24	9	ESC[24m	underline off	ISO
aSGR1	10	ESC[1m	boldface on	ISO
aSGR22	11	ESC[22m	boldface off	ISO
aSFC	12	ESC[nm	set foreground color where n stands for a pair of ASCII digits, 3 followed by any number 0–9	ISO
aSBC	13	ESC[nm	set background color where n stands for a pair of ASCII digits, 4 followed by any number 0–9	ISO
aSHORP0	14	ESC[0w	normal pitch	DEC
aSHORP2	15	ESC[2w	elite on	DEC
aSHORP1	16	ESC[1w	elite off	DEC
aSHORP4	17	ESC[4w	condensed fine on	DEC
aSHORP3	18	ESC[3w	condensed off	DEC
aSHORP6	19	ESC[6w	enlarged on	DEC
aSHORP5	20	ESC[5w	enlarged off	DEC
aDEN6	21	ESC[6"z	shadow print on	DEC (sort of)
aDEN5	22	ESC[5"z	shadow print off	DEC
aDEN4	23	ESC[4"z	doublestrike on	DEC
aDEN3	24	ESC[3"z	doublestrike off	DEC
aDEN2	25	ESC[2"z	NLQ on	DEC
aDEN1	26	ESC[1"z	NLQ off	DEC
aSUS2	27	ESC[2v	superscript on	+ + +
aSUS1	28	ESC[1v	superscript off	+ + +
aSUS4	29	ESC[4v	subscript on	+ + +
aSUS3	30	ESC[3v	subscript off	+ + +
aSUS0	31	ESC[0v	normalize the line	+ + +
aPLU	32	ESCL	partial line up	ISO
aPLD	33	ESCK	partial line down	ISO
aFNT0	34	ESC(B	US char set	DEC
aFNT1	35	ESC(R	French char set	DEC
aFNT2	36	ESC(K	German char set	DEC
aFNT3	37	ESC(A	UK char set	DEC
aFNT4	38	ESC(E	Danish I char set	DEC
aFNT5	39	ESC(H	Swedish char set	DEC
aFNT6	40	ESC(Y	Italian char set	DEC
aFNT7	41	ESC(Z	Spanish char set	DEC

Name	Cmd No.	Escape Sequence	Function	Defined by:
aFNT8	42	ESC(J	Japanese char set	+ + +
aFNT9	43	ESC(6	Norwegian char set	DEC
aFNT10	44	ESC(C	Danish II char set	+ + +
aPROP2	45	ESC[2p	proportional on	+ + +
aPROP1	46	ESC[1p	proportional off	+ + +
aPROP0	47	ESC[0p	proportional clear	+ + +
aTSS	48	ESC[n E	set proportional offset	ISO
aJFY5	49	ESC[5 F	auto left justify	ISO
aJFY7	40	ESC[7 F	auto right justify	ISO
aJFY6	51	ESC[6 F	auto full justify	ISO
aJFY0	52	ESC[0 F	auto justify off	ISO
aJFY3	53	ESC[3 F	letter space (justify)	ISO (special)
aJFY1	54	ESC[1 F	word fill (auto center)	ISO (special)
aVERP0	55	ESC[0z	1/8" line spacing	+ + +
aVERP1	56	ESC[1z	1/6" line spacing	+ + +
aSLPP	57	ESC[nt	set form length n	DEC
sPERF	58	ESC[nq	perf skip n (n > 0)	+ + +
aPERF0	59	ESC[0q	perf skip off	+ + +
aLMS	60	ESC#9	Left margin set	+ + +
aRMS	61	ESC#0	Right margin set	+ + +
aTMS	62	ESC#8	Top margin set	+ + +
aBMS	63	ESC#2	Bottom margin set	+ + +
aSTBM	64	ESC[n;nr	T&B margins	DEC
aSLRM	65	ESC[n;ns	L&R margin	DEC
aCAM	66	ESC#3	Clear margins	+ + +
aHTS	67	ESCH	Set Horiz tab	ISO
aVTS	68	ESCJ	Set vertical tabs	ISO
aTBC0	69	ESC[0g	Clr horz tab	ISO
aTBC3	70	ESC[3g	Clear all h tab	ISO
aTBC1	71	ESC[1g	Clr vertical tabs	ISO
aTBC4	72	ESC[4g	Clr all v tabs	ISO
aTBCALL	73	ESC#4	Clr all h & v tabs	+ + +
aTBSALL	74	ESC#5	Set default tabs	+ + +
aEXTEND	75	ESC[n"x	Extended commands	+ + +

ISO indicates that the sequence has been defined by the International Standards Organization. This is also very similar to ANSI × 3.64.

DEC indicates a control sequence defined by Digital Equipment Corporation.

+ + + indicates a sequence unique to Amiga.

n stands for a decimal number expressed as a set of ASCII digits, for example 12.

For example, let's say you wanted to print a message in boldface on your Epson printer. The following sequence will NOT work.

```
OPEN "PRT:" FOR OUTPUT
  AS #1
PRINT#1, CHR$(27) "G"
  :REM Epson Double-Strike
  On code
PRINT#1, "This would nor-
  mally be boldface, but it
  isn't!"
CLOSE #1
END
```

This next sequence, however, WILL print boldface on an Epson:

```
OPEN "PRT:" FOR OUTPUT
  AS #1
PRINT#1, CHR$(27) "[" "1"
  "m"
: REM PRT: Boldface On
  code
PRINT#1, "This is boldface!"
CLOSE #1
END
```

Not only does the second example work on an Epson, but it will work with any printer that 1) supports boldface, and 2) is listed in Preferences. In summary, to be sure that your programs will drive any printer, you should 1) send your output to the PRT: device, and 2) use the standard Amiga codes.

If your printer has a feature that isn't supported by the standard Amiga codes, or if your printer isn't supported at all in Preferences, you can control it directly by opening the SER: or PAR: devices, depending upon where your printer is connected. For example, if you OPEN "PAR:" FOR OUTPUT AS #1, you can control your parallel printer directly using its native escape codes. However, you will lose the flexibility of being able to drive any printer with your program, no matter what its make or the port it's connected to.

Crowburger Disk Delight

Q: Last issue, you stated that the Commodore 1541 disk drive records on the label side of disks. This is incorrect. Like Apple drives, the 1541 uses the bottom side of disks to record information.

Many Readers
Lots of Places, USA

A: Yeah, (munch) I really blew that one. Thanks for the correction, and my apologies for my mistake (chomp, munch). Since my answer concerning using single-sided disks with the Amiga hinged upon the supposed difference in where Apple and Commodore drives stash information, caution dictates that I retract what I said last month about using single-sided disks on the Amiga (chomp). Don't take a chance on harming your machine or losing valuable data—stick with double-sided disks for your Amiga. (Gulp!)■

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Product Roundup—A look at all the goodies you can buy for your Amiga.

Hardware Expansion—Boxes and boards, pins and slots, auto config and addmem—what's going on here? We provide some answers.

Programming Tutorials—Fundamentals of C and Amiga Basic Graphics keep rolling along.

AmigaDOS Update—Mark and Bill examine version 1.2 of Kickstart and AmigaDOS in the next info.phile.

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130 135 140 145 150	280 285 290 295 300	430 435 440 445 450	580 585 590 595 600

A. How would you rate this issue of AmigaWorld? (pick one)
☐ 1. GREAT! ☐ 2. Very Good ☐ 3. Pretty Good ☐ 4. Good ☐ 5. Fair ☐ 6. Poor ☐ 7. Very Poor ☐ 8. Terrible

B. What will be your next major computer peripheral purchase?
☐ 1. Monitor ☐ 2. Printer ☐ 3. Modem ☐ 4. Memory Expansion ☐ 5. Disk Drive (Hard or Floppy) ☐ 6. Graphics Tablet, Light Pen, Etc. ☐ 7. Gen Lock or Frame Grabber ☐ 8. Music (Midi, Keyboard, etc.) ☐ 9. Other (please specify) ____________

C. Check all the endings that best complete this sentence; "Most of AmigaWorld is ...."
☐ 1. Just Right ☐ 2. Too Simple ☐ 3. Too Complex ☐ 4. Fluff ☐ 5. Useful ☐ 6. Useless ☐ 7. Interesting ☐ 8. Biased ☐ 9. Invaluable

D. What topics would you like to see covered in future issues of AmigaWorld? (Please pick three)
☐ 1. C Language ☐ 2. Amiga Basic ☐ 3. CLI ☐ 4. Telecommunications ☐ 5. Business Applications ☐ 6. IBM Compatibility ☐ 7. Home Applications ☐ 8. Education ☐ 9. Personalities ☐ 10. Company Profiles ☐ 11. How others use the Amiga ☐ 12. Buyer's Guides ☐ 13. Comparative Reviews ☐ 14. Music ☐ 15. Graphics ☐ 16. Program Listings ☐ 17. New Products ☐ 18. Opinions ☐ 19. Hardware Projects ☐ 20. Other (Please specify) ____________

E. What are your favorite things about AmigaWorld? (Please pick all that apply.)
☐ 1. Avision (Publisher's Page) ☐ 2. Zeitgeist (Editor's Page) ☐ 3. Repartee (Letters) ☐ 4. Interviews ☐ 5. Help Key (Questions) ☐ 6. Features ☐ 7. Tutorials ☐ 8. Best of Public Domain ☐ 9. Hors d'oeuvres (hints/tips) ☐ 10. Advertisements ☐ 11. Reviews ☐ 12. News ☐ 13. Call for Authors ☐ 14. Digital Canvas ☐ 15. Articles ☐ 16. Overall Design ☐ 17. Covers ☐ 18. Reader Service Card ☐ 19. Nothing ☐ 20. Everything

F. From the same list in Question E, pick your least favorite things about AmigaWorld.
☐ 1. ☐ 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐ 7. ☐ 8. ☐ 9. ☐ 10. ☐ 11. ☐ 12. ☐ 13. ☐ 14. ☐ 15. ☐ 16. ☐ 17. ☐ 18. ☐ 19. ☐ 20.

G. What is your age?
☐ 1. Under 18 ☐ 2. 18–24 ☐ 3. 25–34 ☐ 4. 35–49 ☐ 5. 50–64 ☐ 6. Over 65

H. What is your education level?
☐ 1. Grade School ☐ 2. High School ☐ 3. Attended College ☐ 4. Graduated College ☐ 5. Some Graduate School ☐ 6. Post Graduate School

I. What is your annual household income?
☐ 1. Less than $15,000 ☐ 2. $15–$19,999 ☐ 3. $20–$24,999 ☐ 4. $25–$29,999 ☐ 5. $30–$34,999 ☐ 6. $35–$49,999 ☐ 7. $50–$74,999 ☐ 8. $75–$99,999 ☐ 9. Over $100,000

J. How many people, other than yourself, read your copy of AmigaWorld?
☐ 1. 1 ☐ 2. 2 ☐ 3. 3 ☐ 4. 4 ☐ 5. None

K. Is this your copy of AmigaWorld?
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A. How would you rate this issue of AmigaWorld? (pick one)
☐ 1. GREAT! ☐ 2. Very Good ☐ 3. Pretty Good ☐ 4. Good ☐ 5. Fair ☐ 6. Poor ☐ 7. Very Poor ☐ 8. Terrible

B. What will be your next major computer peripheral purchase?
☐ 1. Monitor ☐ 2. Printer ☐ 3. Modem ☐ 4. Memory Expansion ☐ 5. Disk Drive (Hard or Floppy) ☐ 6. Graphics Tablet, Light Pen, Etc. ☐ 7. Gen Lock or Frame Grabber ☐ 8. Music (Midi, Keyboard, etc.) ☐ 9. Other (please specify) ____________

C. Check all the endings that best complete this sentence; "Most of AmigaWorld is ...."
☐ 1. Just Right ☐ 2. Too Simple ☐ 3. Too Complex ☐ 4. Fluff ☐ 5. Useful ☐ 6. Useless ☐ 7. Interesting ☐ 8. Biased ☐ 9. Invaluable

D. What topics would you like to see covered in future issues of AmigaWorld? (Please pick three)
☐ 1. C Language ☐ 2. Amiga Basic ☐ 3. CLI ☐ 4. Telecommunications ☐ 5. Business Applications ☐ 6. IBM Compatibility ☐ 7. Home Applications ☐ 8. Education ☐ 9. Personalities ☐ 10. Company Profiles ☐ 11. How others use the Amiga ☐ 12. Buyer's Guides ☐ 13. Comparative Reviews ☐ 14. Music ☐ 15. Graphics ☐ 16. Program Listings ☐ 17. New Products ☐ 18. Opinions ☐ 19. Hardware Projects ☐ 20. Other (Please specify) ____________

E. What are your favorite things about AmigaWorld? (Please pick all that apply.)
☐ 1. Avision (Publisher's Page) ☐ 2. Zeitgeist (Editor's Page) ☐ 3. Repartee (Letters) ☐ 4. Interviews ☐ 5. Help Key (Questions) ☐ 6. Features ☐ 7. Tutorials ☐ 8. Best of Public Domain ☐ 9. Hors d'oeuvres (hints/tips) ☐ 10. Advertisements ☐ 11. Reviews ☐ 12. News ☐ 13. Call for Authors ☐ 14. Digital Canvas ☐ 15. Articles ☐ 16. Overall Design ☐ 17. Covers ☐ 18. Reader Service Card ☐ 19. Nothing ☐ 20. Everything

F. From the same list in Question E, pick your least favorite things about AmigaWorld.
☐ 1. ☐ 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐ 7. ☐ 8. ☐ 9. ☐ 10. ☐ 11. ☐ 12. ☐ 13. ☐ 14. ☐ 15. ☐ 16. ☐ 17. ☐ 18. ☐ 19. ☐ 20.

G. What is your age?
☐ 1. Under 18 ☐ 2. 18–24 ☐ 3. 25–34 ☐ 4. 35–49 ☐ 5. 50–64 ☐ 6. Over 65

H. What is your education level?
☐ 1. Grade School ☐ 2. High School ☐ 3. Attended College ☐ 4. Graduated College ☐ 5. Some Graduate School ☐ 6. Post Graduate School

I. What is your annual household income?
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J. How many people, other than yourself, read your copy of AmigaWorld?
☐ 1. 1 ☐ 2. 2 ☐ 3. 3 ☐ 4. 4 ☐ 5. None

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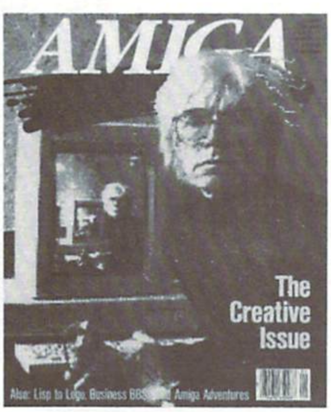
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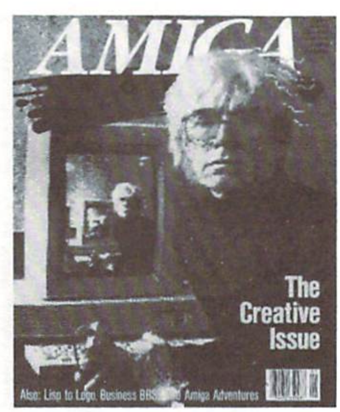
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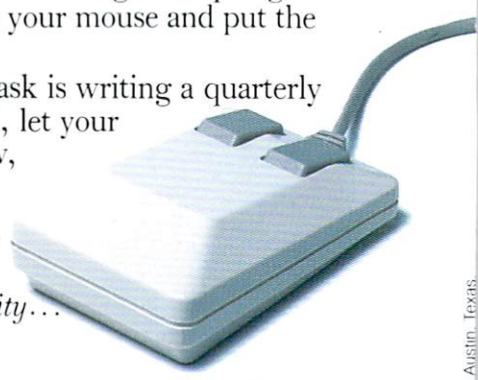
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